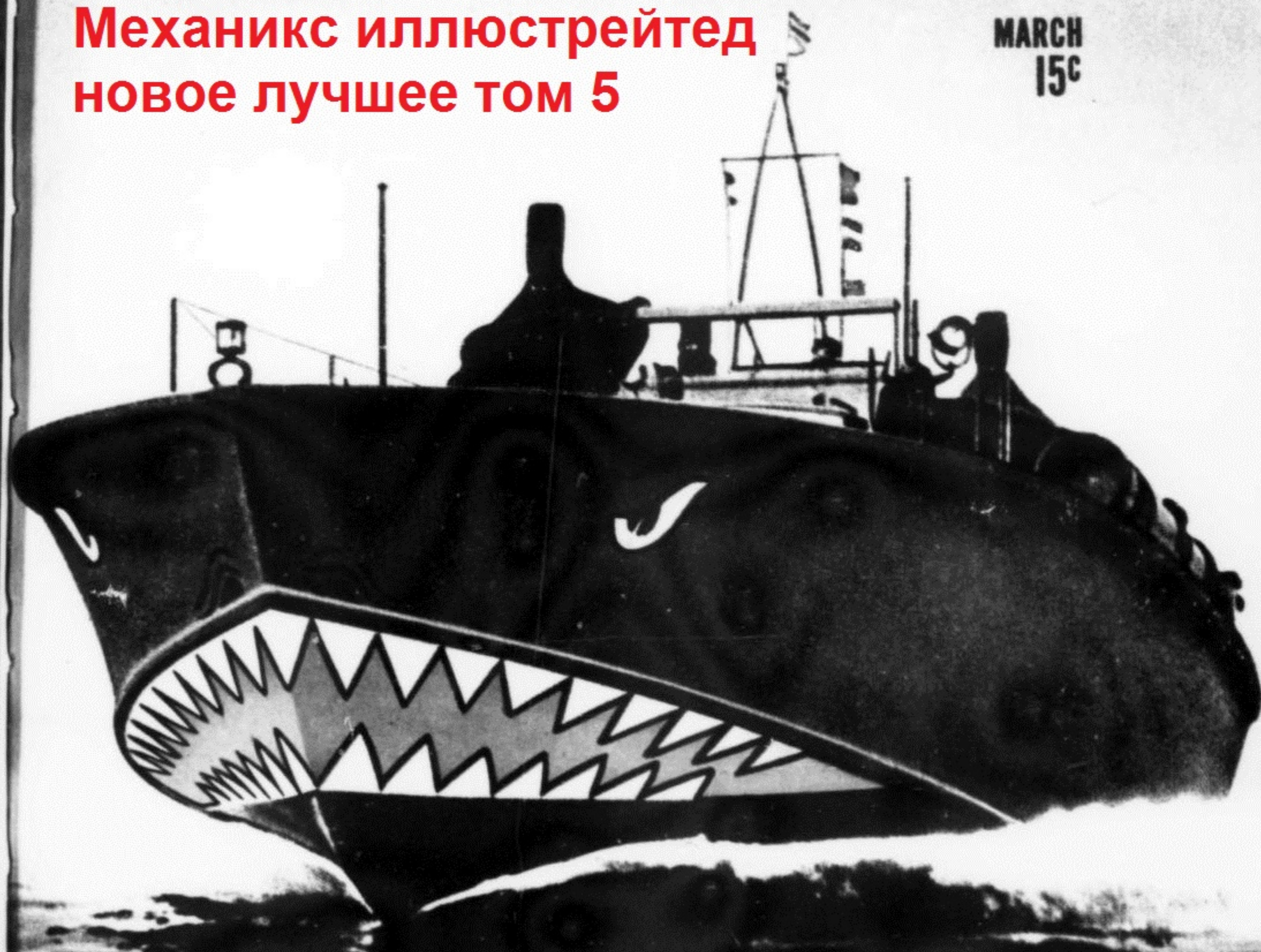


MECHANIX ILLUSTRATED

A FAWCETT MAGAZINE

Механикс иллюстрейтед
новое лучшее том 5

MARCH
15¢



GREEN DRAGONS OF THE
SOLOMONS • SEE PAGE 44

FREE! MORE THAN \$5,000.00 IN PRIZES
4TH ANNUAL MI BUILDWORDS CONTEST • SEE PAGE 61

MECHANIX ILLUSTRATED

Title registered U. S. Patent Office

W. H. FAWCETT, JR., President

ROGER FAWCETT, General Manager

Editors: Roland Cueva Bill Williams

Associate Editors: George Daniels, *Aviation*; Sturges Schley, *News*;
Gilbert Paust, *Crafts & Hobbies*; Ruth Phillipps, *Production*; Bernard Wolfe, *Features*

MARCH 1944

VOL. XXXI NO. 5

THE MECHANIX ILLUSTRATED ADVISORY INVENTIONS BOARD

WILBUR SHAW

Noted automotive engineer and
inventor

CLYDE PANGBORN

Aviation pioneer

DR. LOUIS D. CLEMENT

Noted physicist, chemist and
inventor

SIR HUBERT WILKINS

Scientist and explorer

DR. JAMES L. CLARK

Explorer and Assistant Curator of
the American Museum of
Natural History

LT. COMDR. BOB BARTLETT

U. S. Navy

On the cover: The Elco-Puss PT boat in shark camouflage

SPECIAL FEATURES

THE TERRIBLE HANDFUL— by Capt. George P. Hunt With guts, guns, swords, Marines hold a Guadalcanal River	35
JET-DRIVEN DEVIL	39
I'VE GOT A CASTLE ON THE RIVER NILE— by Comm. Attilio Gatti How to build a modern palace in the African bush	40
GREEN DRAGONS	44
CYCLES PREDICT THE FUTURE— by Donald Cooley No. 2 in our series on forecasting the future scientifically	46
MAGIC CLOAK OF INVISIBILITY— by W. H. Kimball A war mystery is explained—our casualties should be fewer	50
JUNIOR LIBERTY SHIP	53
CONTINENT OF TOMORROW— by Henry Albert Phillips No. 5: Peru—Guano, gold, llamas and boom- ing industry	54
THE FUTURE OF ELECTRONICS— by Dr. Irving Langmuir A World-famous scientist makes a travel prediction	58
THE FOURTH M. I. WORD CONTEST Over \$5,000 in War Bond prizes	61
FROM HAWK TO THUNDERBOLT— by Maj. J. J. Kruzel Part 2 of wearing out a P-40 over Java to rate revenge in a P-47	64
NAZI ROCKET GUN	67
LANDING—ON THE ENEMY—by Beryl D. Kneen With both feet from amphibious craft	68
SCIENCE IN PICTURES—Starting on	71

DEPARTMENTS

YOUR INVENTION CLINIC	14
CHIPS FROM THE EDITOR'S WORKBENCH	16
MONEYMAKERS AND MONEYSAVERS (Classified Ads)	26

CRAFTS AND HOBBIES

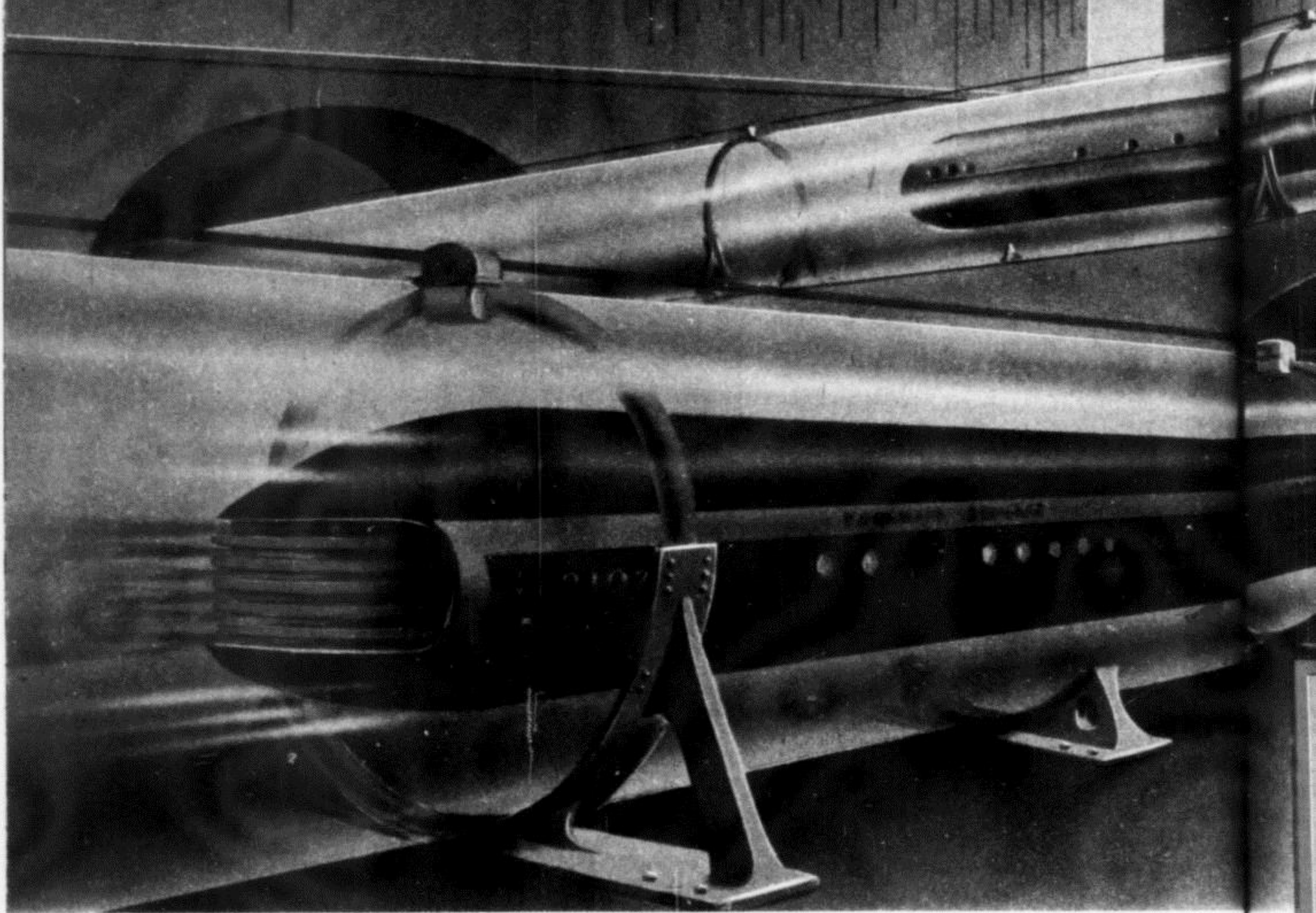
FRONTISPIECE	83
WINDING STAIRS ARE SPACE SAVERS	84
ANEMOMETER Made from an old car speedometer	90
MAGAZINE RACK	92
HOUSEWARE FROM WOOD	94
ALL-WOOD DRILL PRESS Non-priority version of a useful tool	96
REFECTORY TABLE AND CHAIR	100
THE SCHOOL SHOP Pre-flight aviation lesson No. 13	102
IDEAS FOR SERVICE MEN	106
MODELMAKERS' CENTER SQUARE	108
INSIDE BORING AND TURNING	108
GAY 90's CARRIAGES Snazzy buggies of bygone days	109
PLASTER PLAQUES A clay modeling project	112
RECONDITION YOUR FURNITURE	114
CUT-OFF SAW	116
THE LAST WORD IN PADDLEBOARDS	118
TRANSPARENCY VIEWER	121
PHOTO CONTEST	122
PHOTO KINKS	123
PHOTO CHEMICAL SCALES Victory model	124
STORY IN PICTURES! Personalize your photo albums	126
HOME AIDS	128
MACHINIST'S CHEST IN MINIATURE For the smoker	130

Copyright 1944 by Fawcett Publications, Inc.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville 1, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York 18, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1944 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 15c per copy. Subscription price \$1.80 per year in U. S. and possessions. Canadian or foreign subscriptions not accepted. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

THE FUTURE OF ELECTRONICS



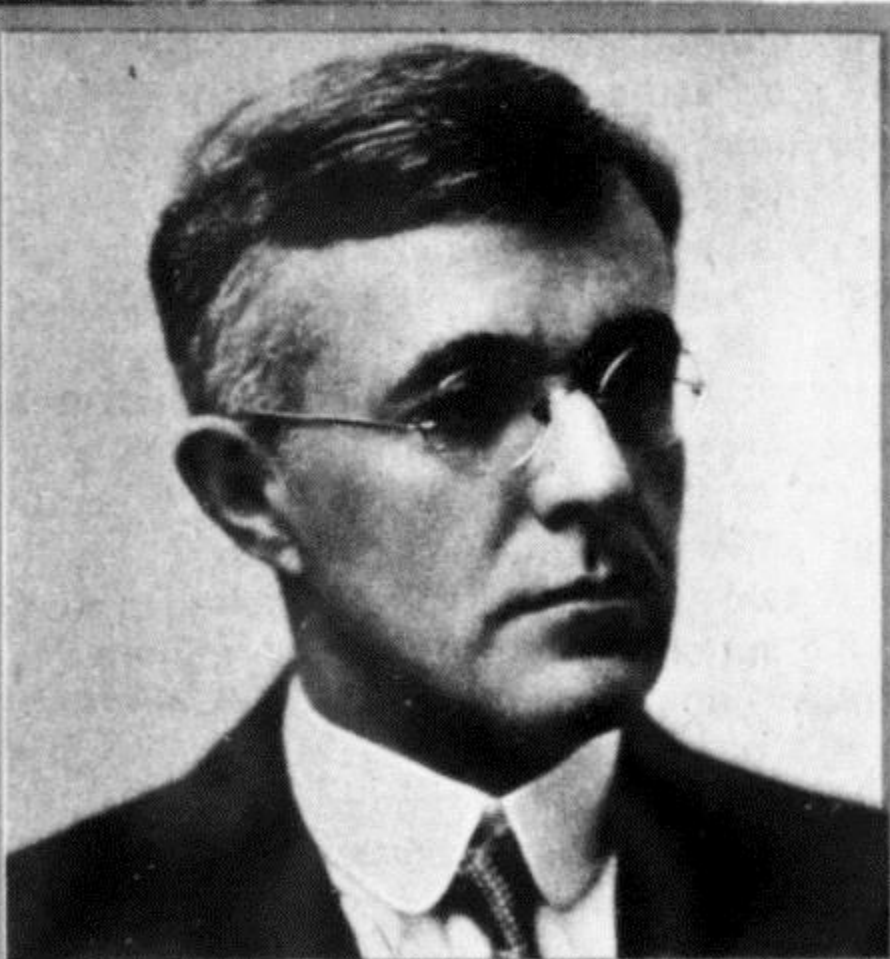
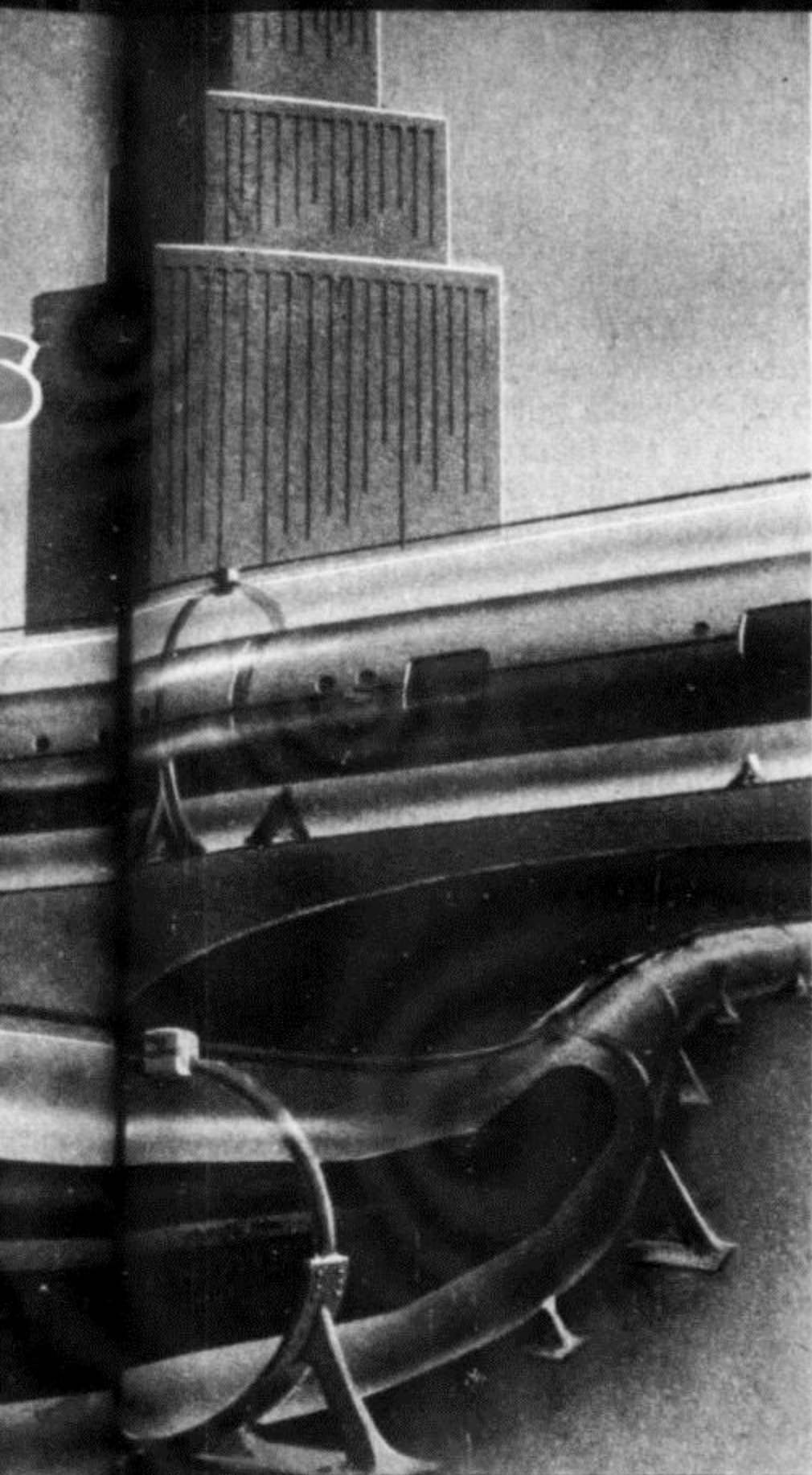
"There is no reason why we could not travel at a speed of 2,000 to 5,000 m.p.h. in a vacuum tube in which air tight vehicles are magnetically suspended in space," says the author. "With such a system, Chicago would be about one-half hour from New York." Artist Fred Ripperda's conception of such an electronic express is shown here.

by Dr. Irving Langmuir

A distinguished General Electric scientist discusses
the mysteries of today's most fascinating subject.

WE ARE now on the eve of another great upsurge in progress in the field of electronics. Hundreds of thousands of men in our armed forces have been given technical training with electronic devices. Very great

numbers of men from university research laboratories and industrial research laboratories have been carrying on pioneering work in electronics for the war. There has been a tremendous development in industrial equip-



Dr. Irving Langmuir is Associate Director of the General Electric Laboratories, winner of a Nobel Prize for chemistry and one of the world's foremost authorities on electronics.

ment for factories and trained workers who have been building electronic devices for war needs.

It took 20 years from Roentgen's discovery of X-rays to the development of the practical standardized X-ray equipment for the medical profession. Again, it was roughly twenty years from the discovery of the electron in 1897 to the widespread use of electron tubes in the first World War; and another five years before the public received the benefit in the form of radio sets.

The war electronics of today, about which as yet little can be said, if given proper encouragement and support will develop spontaneously into the Electronics of Tomorrow. It may take 10 to 20 years to utilize fully the discoveries that have been made since Pearl Harbor. Rather than make definite predictions it is thus better to think of the possibilities that lie ahead.

Electronics is a branch of Science which deals with devices, and techniques, employing electrons detached from ordinary forms of matter. It is this very freedom of the electron which makes electronics so versatile. It can deal with voltages so minute that a thought or brain wave may initiate an impulse that can be recorded or the electronic device may deal directly with millions of volts. The Betatron, for example, designed by Dr. Kerst, has given electrons with energies corresponding to one hundred million volts.

Electronic devices can be used to control voltages or currents so that they stay unchanged over long periods of time, or other devices correspond to changes that take place in a billionth of a second. Some electronic devices operate with the minute electric currents of the electrocardiograph while others handle many thousands of amperes. An illustration of the application of the large current device is given by the recently built large new plants to make aluminum and magnesium for our airplanes.

In producing these metals direct current is needed which would be obtained from alternating current by rotating machines, called motor generators. Actually 2,500,000 kw. of electronic devices have been used for this purpose and their use has saved for war needs something like forty million pounds of steel and four million pounds of copper which would have been needed to make the motor generators and has saved many months' time in putting the aluminum and magnesium plants into operation.

Electric welding of sheet metal now takes

place very much as cloth is sewed by the sewing machine. If the current is a little too large holes are made in the metal, whereas if the current is too small a tight weld is not produced and leakage occurs. The precise control afforded by the electronic devices gives an enormous improvement and has resulted in the almost universal use of this welding equipment.

If a current at a frequency from 10,000 to 1,000,000 cycles is passed through a coil and a metallic object is placed within the coil heat is generated within the object. If the frequency is low enough the current can be generated all the way through the object including the center. At high frequencies, however, heating occurs only at the surface and it is possible to heat so rapidly that only a thin layer becomes heated. Thus in 2 or 3 seconds a cog wheel can have its surface brought to red heat, then suddenly cooled to produce a thin hard wearing surface while the interior of the teeth still remain tough and strong. That would be impossible by any other known method.

On the other hand, the yolk of an egg can be cooked while keeping the white cold, or even frozen. A modification of the same high frequency coils can be used for heating an inner part of the human body. Such methods have proved very valuable in the treatment of certain diseases.

Our agricultural community now struggles under a tremendous burden in carrying on its task of feeding the human race. Men labor in the hot sun, in scorching winds, or frequently in downpours of rain with tiring, tedious jobs that cannot now be avoided if other men are to escape starvation. Fruit which nature provides bountifully must be gathered by ladder climbing, long reaching workers who must pick each fruit by hand.

I can conceive of an orchard operated entirely without workers in which the fruit bearing trees can be cared for and cultivated and the fruit picked by machines operated and controlled by electronic devices.

An adaptation of the electric eye and the techniques of television should make possible the construction of a machine which will scan the green tree, locate the red or orange colored fruit and direct electrically operated mechanical arms to pick it from the branches, sort it according to size and quality and convey it to containers. The machine could be set to collect only fruit of any desired degree of ripeness.

As long as there is any difference of height

or color between useful plants in a field and invading weeds, an electronic device could be designed to make weeding an entirely electrical and mechanical operation.

The inventive mind can and probably will develop the possibilities of transforming farming into an entirely new type of activity in which the physical burdens are lifted from the shoulders of the farm workers.

Let us look at the field of transportation.

Wheeled vehicles seem to have definite speed limits. Higher speeds are attainable in the air, but here too, there are limits set by the speed of sound which restrict propeller driven planes to something like 500 miles per hour.

There is no fundamental reason, however, why we could not travel at a speed of 2,000 to 5,000 miles per hour in a vacuum tube. Such a tube extending from New York to Chicago, or to San Francisco, would be constructed in which air tight vehicles are magnetically suspended in space while moving forward at high speed. The intricate operations would be controlled throughout by electronic devices. It was because of doubts expressed by some of our engineers as to the feasibility of suspending vehicles in vacuum that I devised, with the help of Dr. Tonks of our laboratory, the exhibit of levitation that was shown at the House of Magic at the New York World's Fair.

With such a high speed transportation system Chicago might be moved to a travel distance of about one half hour from New York and the Pacific coast might be only about an hour away from the Atlantic.

Let us take a glance at our cities. From the viewpoint of efficient operation and engineering expediency they are in a chaotic state. Dense automobile traffic operates in them yet every city is a network of dangerous grade crossings—to mention only one problem of conditions within congested communities. We must plan on building our cities on a two level street plan throughout with traffic on any highway never moving except in one direction and with no grade crossings. There are numerous other factors which necessitate the rebuilding of our cities.

The projects I have mentioned are but illustrations of possibilities. It is what people really want that will determine what is best. We must think in terms of converting our vast war production machine to an equally vast peacetime production which will use all present workers and the returned soldiers as well.

JET-DRIVEN DEVIL



ALLIED air forces will soon take into action a revolutionary jet-driven fighter, said to look like a P-38 minus propellers. By sucking in air, mixing it with fuel, and expelling jets of exhaust gases, the ship achieves speeds of 500 to 600 m.p.h., soars high into the sub-stratosphere. Inventor is Group Capt. Frank Whittle of the RAF, at left. The new

plane has tremendous lifting power, allows greater bomb loads, requires less armor and armament. It uses a smaller take-off area, produces little vibration, can slip noiselessly over its target, cuts pilot fatigue way down. Sketch above is conception of MI staff artist based on newspaper reports stating the resemblance to the P-38.

FRED RIPPERS

MECHANIX ILLUSTRATED

ST. PAUL
PUBLIC LIBRARY

AUG 9 1943

RECEIVED

A FAWCETT MAGAZINE

SEPTEMBER
15c

FIRST PHOTOGRAPH OF
THE NEW DE BOTHEZAT
CO-AXIAL HELICOPTER



WE BATTLED NAZI TANKS

BY CORP. S. A. DAVIS
SEE PAGE 35

MECHANIX ILLUSTRATED

Title registered U. S. Patent Office

W. H. FAWCETT, JR., President

Editors: Roland Cueva Bill Williams

Associate Editors: George Daniels, *Aviation*; Thomas J. Naughton, *News*; Gilbert Paust, *Crafts & Hobbies*; Mary Driscoll, *Production*.

Copyright 1943 by Fawcett Publications, Inc.

SPECIAL FEATURES

On the Cover: The first flight photograph ever published of the De Bothezat co-axial helicopter—a revolutionary development in a great new aerial field, described on page 48 of this issue. Photo by Baron von Poushental.

We Battled Nazi Tanks	35
<i>by Cpl. S. A. Davis—hammer blows at Faid Pass</i>	
An Adventure in Counting	38
<i>by F. Emerson Andrews—new numbers by the dozen</i>	
Microbe Killer	41
Your New Job After the War	42
<i>by Donald G. Cooley—new fields of opportunity, described in the twelfth article of MI's series about "A World You Never Knew"</i>	
The Helicopter Is Here	45
Revealing A New Helicopter	48
<i>by Capt. Boris Sergievsky—the De Bothezat helicopter, aircraft of tomorrow</i>	
Sky-Buster	50
<i>by Darrell Huff and Lawrence N. Eldred—Thomas Midgley wins air battles from a wheelchair</i>	
Gadgets to Save Your Life	53
Floating Firecrackers	54
<i>by BM 1/c W. J. Chapman, USN—there's never a dull moment in the Naval Armed Guard</i>	
Gliders That Go By Jeep	57
The ABC of Rockets, Part I	58
<i>by Willy Ley—how this war's newest weapon works</i>	
South America Calling	62
<i>by Lilo Linke—introducing Paco Villar, a good neighbor you'll enjoy meeting</i>	
Floating Drawbridge	65
Battleground In Maryland	66
Addressed For Action	68
<i>by Lt. (j. g.) Maxwell Hamilton, USNR—communications officers have to be good</i>	
SCIENCE IN PICTURES, starting on	71
CRAFTS AND HOBBIES, starting on	83

(Continued on page 8)

THE MECHANIX ILLUSTRATED ADVISORY INVENTIONS BOARD

WILBUR SHAW

Noted automotive engineer and inventor

CLYDE PANGBORN

Aviation pioneer

DR. LOUIS D. CLEMENT

Noted physicist, chemist and inventor

SIR HUBERT WILKINS

Scientist and explorer

DR. JAMES L. CLARK

Explorer and Assistant Curator of the American Museum of Natural History

LT. COMDR. BOB BARTLETT

U. S. Navy

ROBERT COLES

Noted astronomer, Assistant Curator of the Hayden Planetarium

NEXT MONTH

The American troops who launched and carried through the attack on Guadalcanal were tough, trained fighting men, but they found out that they still had a lot to learn about battling Japs. Many of their ideas about the way Japs fight were proved wrong. Many of their ideas about the best ways to fight Japs were changed and improved. And everything they learned was important, for their experience is going to guide all the Americans who will tangle with Japs, before this war is won, from the Aleutians to Singapore. For a preview of how the war in the East will be fought, read *What We Learned at Guadalcanal*, by Captain Gerald H. Shea, in the October MECHANIX ILLUSTRATED. It's a must!



MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1106 W. Broadway, Louisville 1, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York 18, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1943 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 15c per copy. Subscription price \$1.50 per year in U. S. and possessions. Canadian or foreign subscriptions not accepted. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

THE HELICOPTER IS HERE

FEW persons realize the great background the helicopter has. Fewer persons realize the helicopter's immense future. On this and the following pages, MECHANIX ILLUSTRATED attempts, for the first time in any national publication, to show the helicopter in its true perspective—not as a freak flying contraption, but as a unique type of aerial transportation, developed over a period of many years until it has finally reached a stage of perfection where it can take its place beside the airplane.

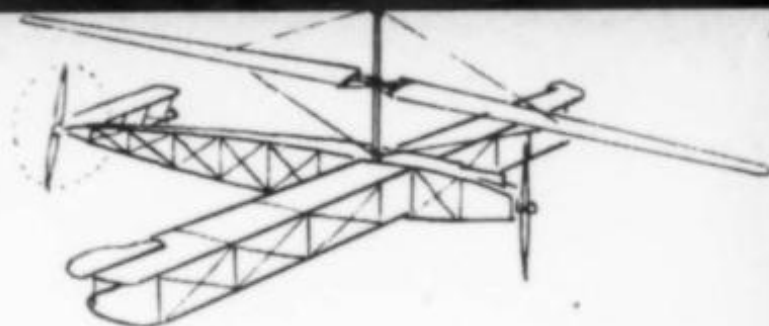
On this page we present the highlights of the helicopter's past development. On the next two pages we give you a preview of developments which may be expected in the not-too-distant future. On pages 48 and 49 we present the first published story and photographs on an entirely new type of helicopter, radically different from the Sikorsky design, written by Captain Boris Sergievsky.

And what of the helicopter's present? That is best answered by the following cold facts: Sikorsky now has a factory at Bridgeport, Conn., devoted exclusively to the manufacture of helicopters. The Nash-Kelvinator Co. is manufacturing helicopters. Henry Kaiser is manufacturing helicopters. The government has ordered Henry Ford to start manufacturing helicopters. The Norge Division of Borg-Warner Corporation, at Detroit, has gone into mass production of helicopter parts. The Armies and Navies of the U. S., England and Canada are already using helicopters on an increasingly large scale. Greyhound Bus Lines has applied for a permit to operate helicopter buses. In letters to the editors of MECHANIX ILLUSTRATED, more than a dozen airplane and motor companies have indicated that they are currently manufacturing or experimenting with helicopters, although the details of their operations are necessarily veiled in secrecy.

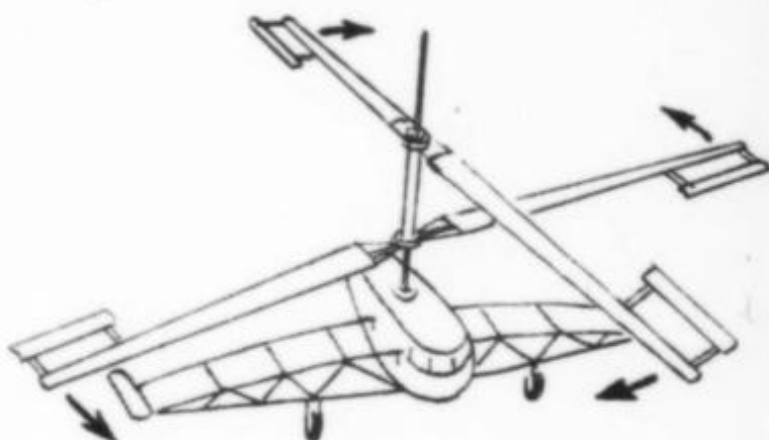
In its issue of July, 1942, MECHANIX ILLUSTRATED published the first article to appear in any national publication telling of the successful completion of Igor Sikorsky's experiments. Now MI, the nation's leading exponent of the helicopter since that time, feels it can safely say: The helicopter is here!

De Bothezat. Engine is 85 h.p., air-cooled. Flew in 1942. Designed by inventor of world's first helicopter.

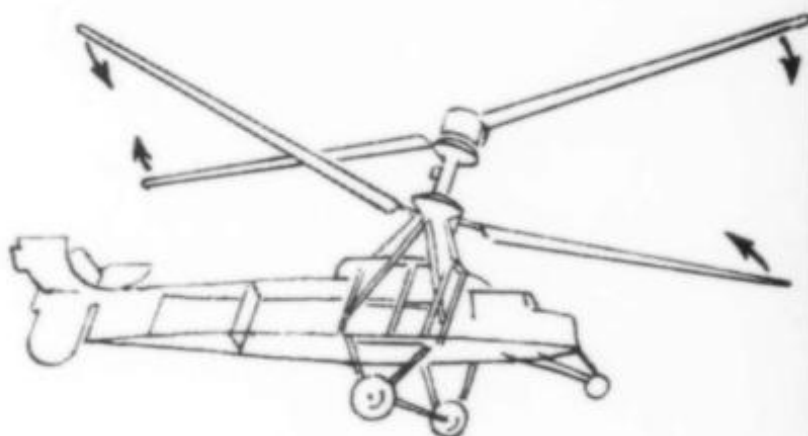
September, 1943



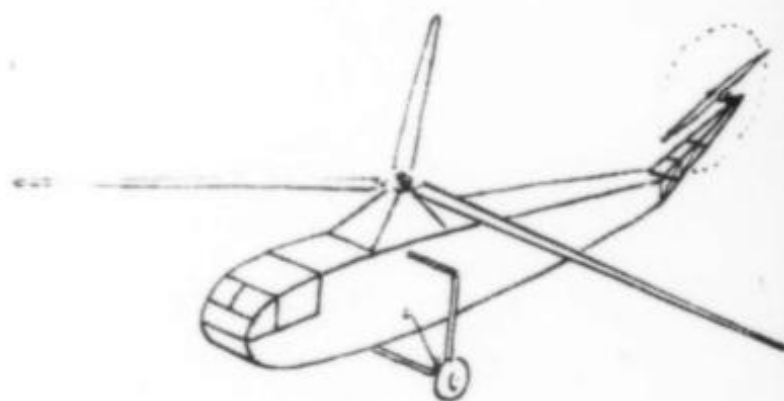
Von Baumhauer. Main rotor ran by 200 h.p. engine. Tail rotor had separate 80 h.p. engine. Flew in 1930.



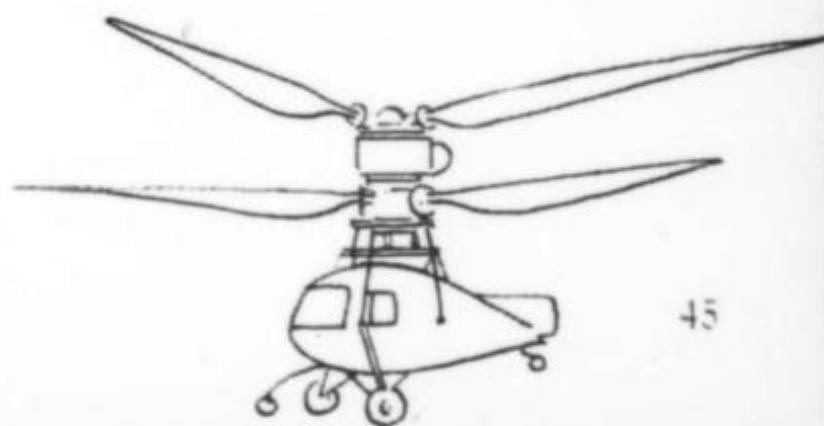
D'Ascanio. Had 95 h.p., broke three records in 1930, for distance, time, and altitude, in many flights in Italy.



Brequet. Engine was 350 h.p. Flew in 1935. Made rapid vertical flight. Brequet designed 16-ton helicopter.



Sikorsky. Horsepower of newest ship not released. Highly successful, used by U. S. Army. Two passenger.



Test flight of the De Bothezat GB-5 helicopter proved it easy-handling and efficient.



REVEALING A NEW HELICOPTER



Capt. Boris Sergievsky, chief test pilot for Igor Sikorsky for 14 years, is well known for his work in developing the Pan American Clippers. A Russian ace in World War I, credited with 11 planes, Capt. Sergievsky test-flew the De Bothezat helicopter.

A NEW type helicopter, as compact as a racing car, floated vertically into the air at Roosevelt Field recently—then skimmed smoothly across the outskirts of the airport on its first free flight. That helicopter was the De Bothezat GB-5, designed by Dr. George de Bothezat—Russian-born aircraft wizard who invented and built the world's first successful man-carrying helicopter in 1922, for the United States Army.

As with previous De Bothezat helicopters, the strictest secrecy was maintained about the GB-5 from the time it first took shape in the plant of the Helicopter Corporation of

by Captain

Boris Sergievsky

as told to George Daniels

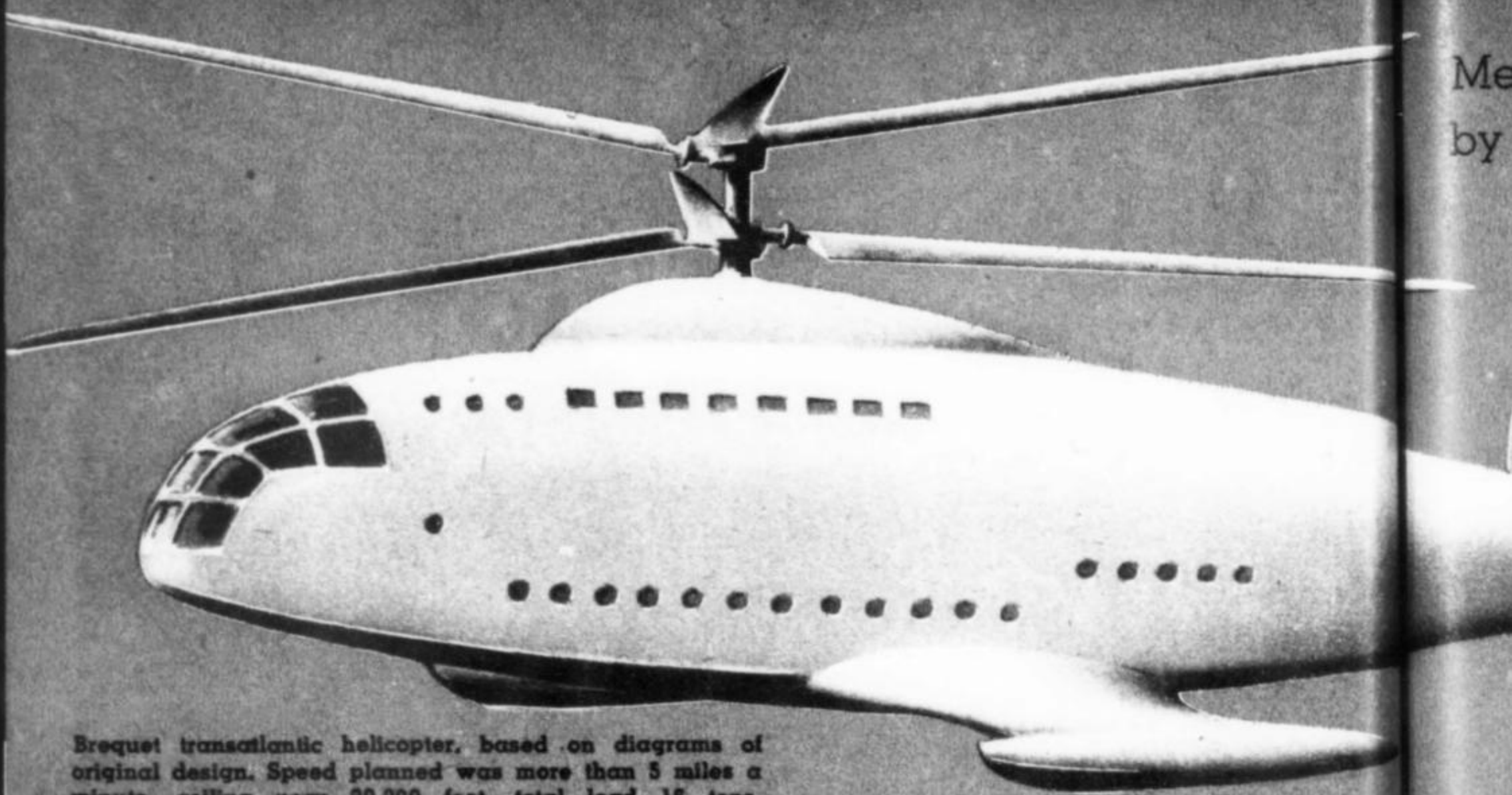
America to the time that its twin rotors lifted it into the air. Even the site for its first take-off was cautiously set at the furthestmost rim of the airport.

Aside from the designer himself, only a handful of his trusted co-workers knew the secrets of the machine's design, and these men knew the vital importance of protecting that secrecy. Years before, the first De Bothezat helicopter had been sabotaged—even before the U. S. Army's Colonel T. H. Bane took it up on its first flight. Sand had been placed in the crankcase of the engine as the ship waited at McCook Field for the test hop. An attempt had been made on De Bothezat's life: a deadly poisonous snake mailed alive to him in a deceptive package.

But sabotage and attempted murder could not stop De Bothezat. He replaced the ruined

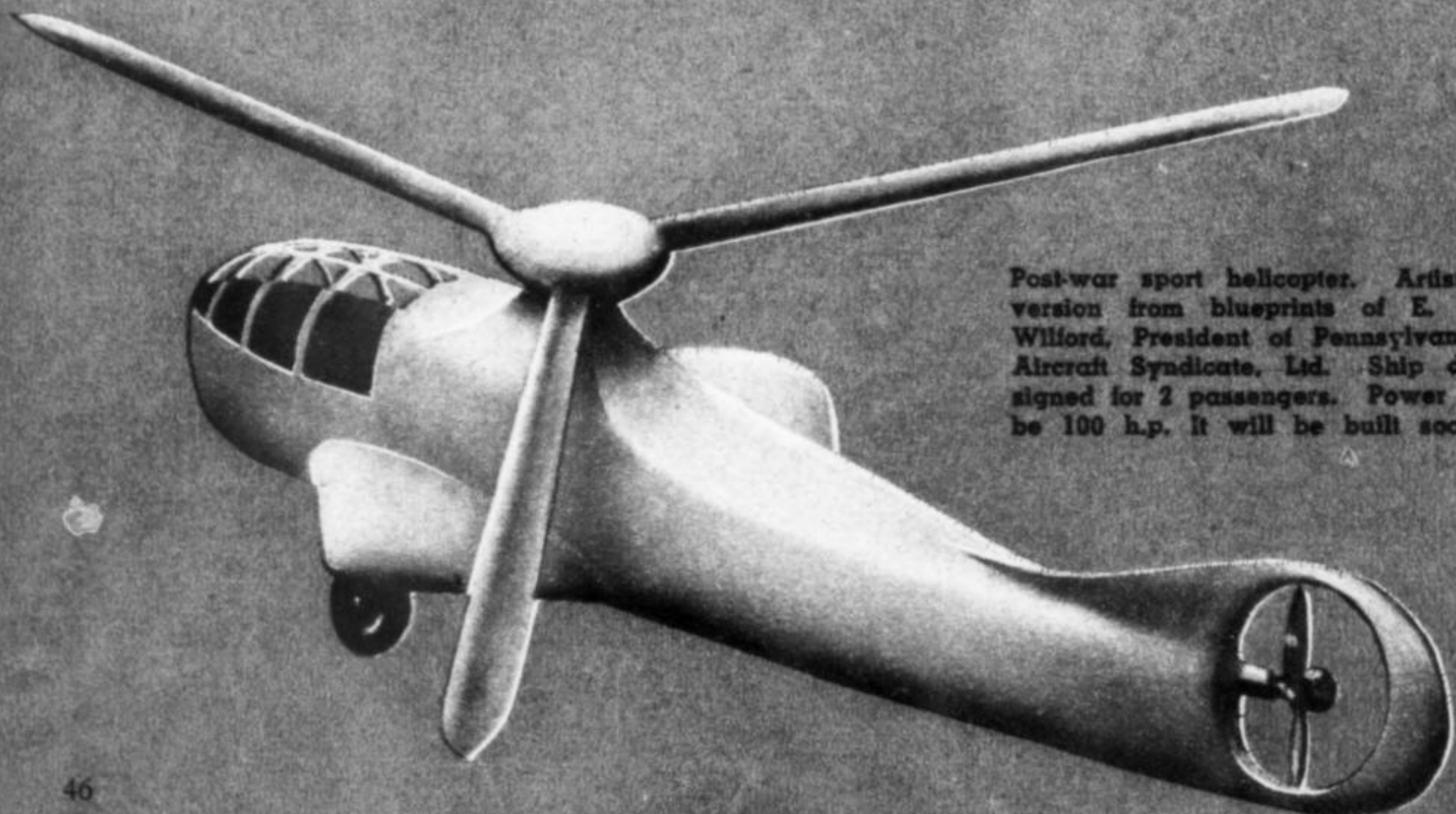
Mechanix Illustrated

engin
horse
copte
pilot
weig
Af
know
out
beyo
only
Ag
the
rock
air v
four
roto
test
hors
pou
pow
So
zat's
they
uses
in t
set,
air
Yor
T
the
De
from
mat
sigr
the
flov
not
from
ang
ma
ver
Bo
bla
pri
sha
he
me
tur
on
me
tor
the
th
of
th
ro
qu
Se



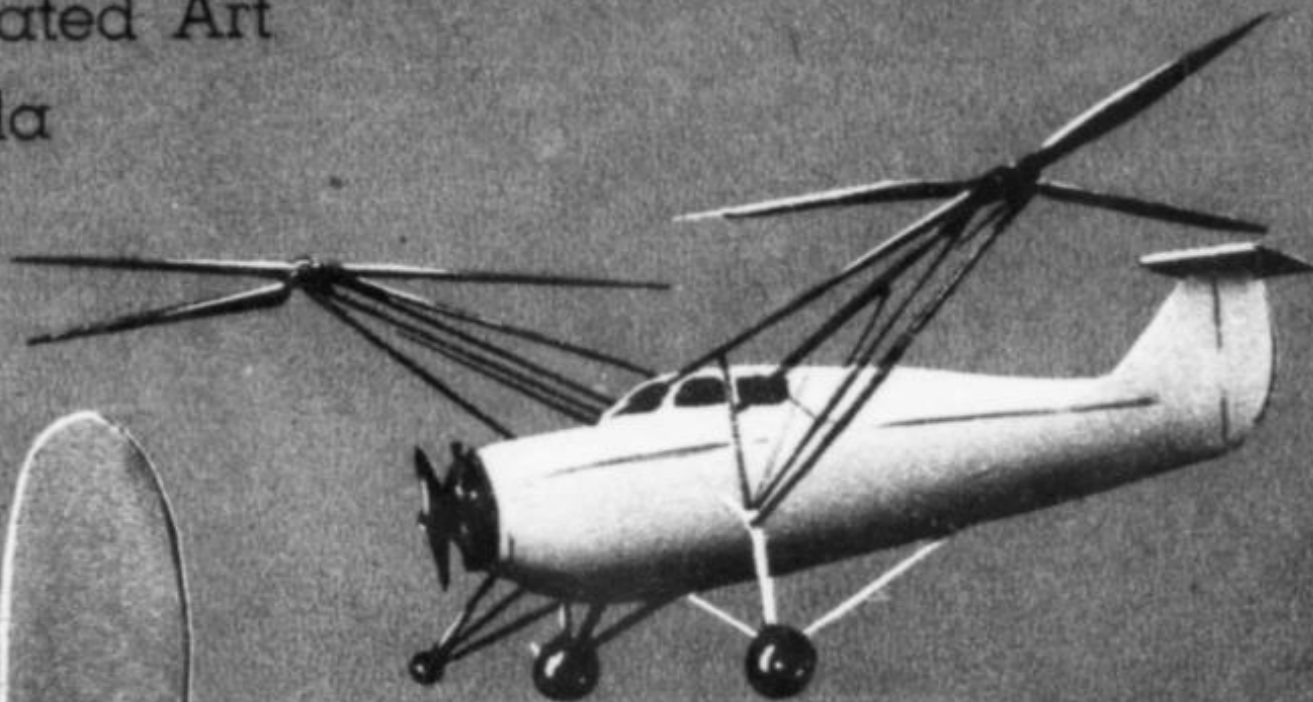
Breguet transatlantic helicopter, based on diagrams of original design. Speed planned was more than 5 miles a minute, ceiling near 20,000 feet, total load 16 tons.

The helicopters portrayed on these pages are based on actual designs by leading pioneers of rotary-wing aircraft throughout the world. At the center of these pages is published for the first time a drawing, based on an original sketch by the inventor, E. Burke Wilford, of a helicopter with a jet-propelled and counter-balanced rotor. A giant Breguet transatlantic ship was in the engineering stage when war broke out. Helicopters similar to the smaller ships have already been tested.

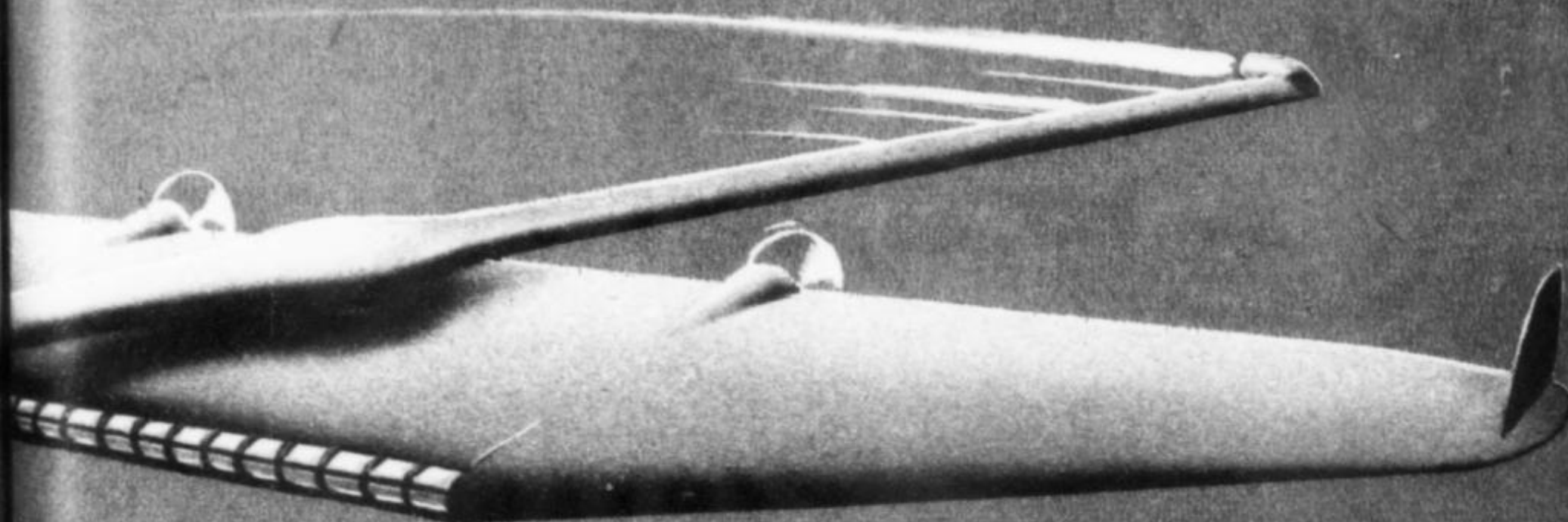


Post-war sport helicopter. Artist's version from blueprints of E. B. Wilford, President of Pennsylvania Aircraft Syndicate, Ltd. Ship designed for 2 passengers. Power to be 100 h.p. It will be built soon.

Mechanix Illustrated Art by Fred Ripperda

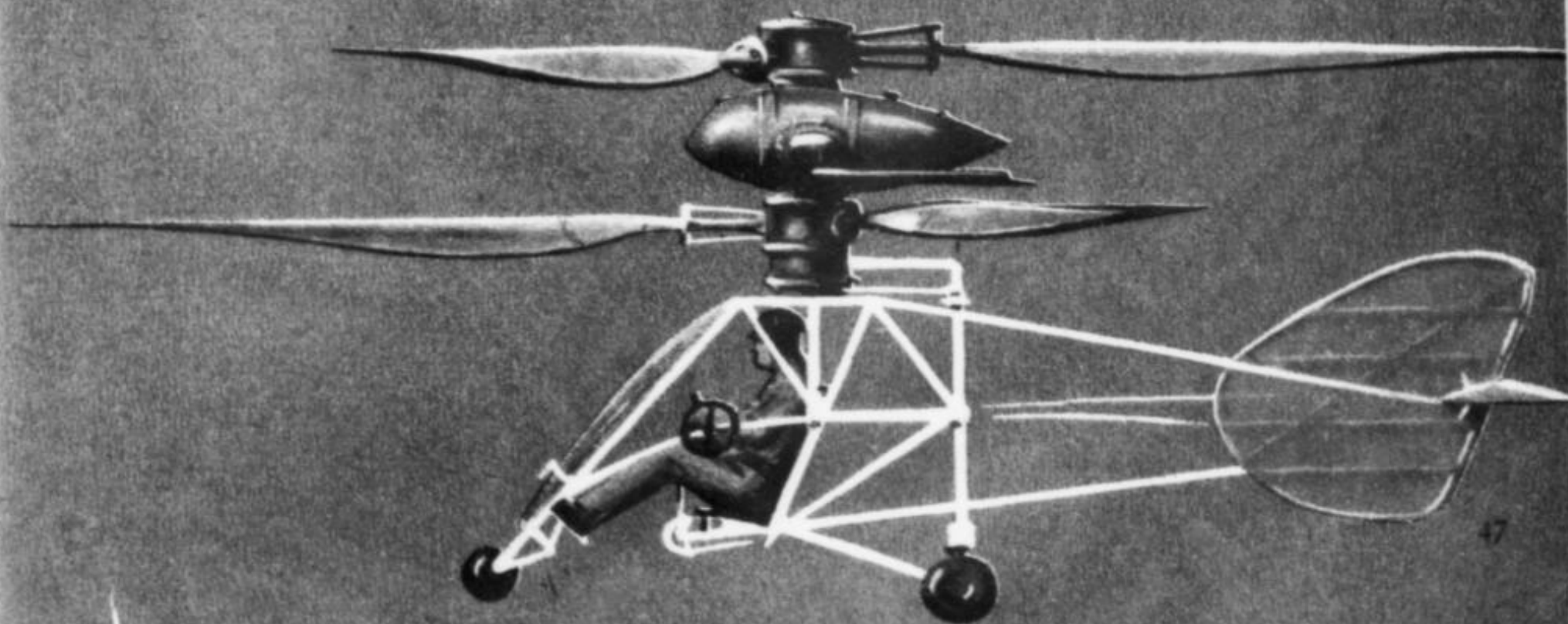


Helicopter taxi on Focke-Wulf lines. Focke-Wulf helicopter held duration record until Igor Sikorsky set new one. Rotors are tilted to provide forward motion.



Willford helicopter-flying-wing transport. Single-bladed rotor is jet-propelled, blowers housed in wing. Rotor speed of 500 m.p.h. or more would make jet-propulsion efficient, eliminate torque. Traveling forward, rotor stops, points tailward as stabilizer while props drive ship.

De Bothezat heli-hop, flying motorbike of tomorrow. Small motor of 25 or 30 h.p. to be used in single seater. Fly it from rooftop.



engine with an old second-hand motor of 180 horsepower, and sent the world's first helicopter roaring vertically into the air with a pilot and three passengers, plus its own weight of nearly two tons!

After more than 100 flights that little-known Army helicopter of 1922, built without a single wind tunnel test, had proved beyond all doubt that vertical ascent was not only possible, but practical.

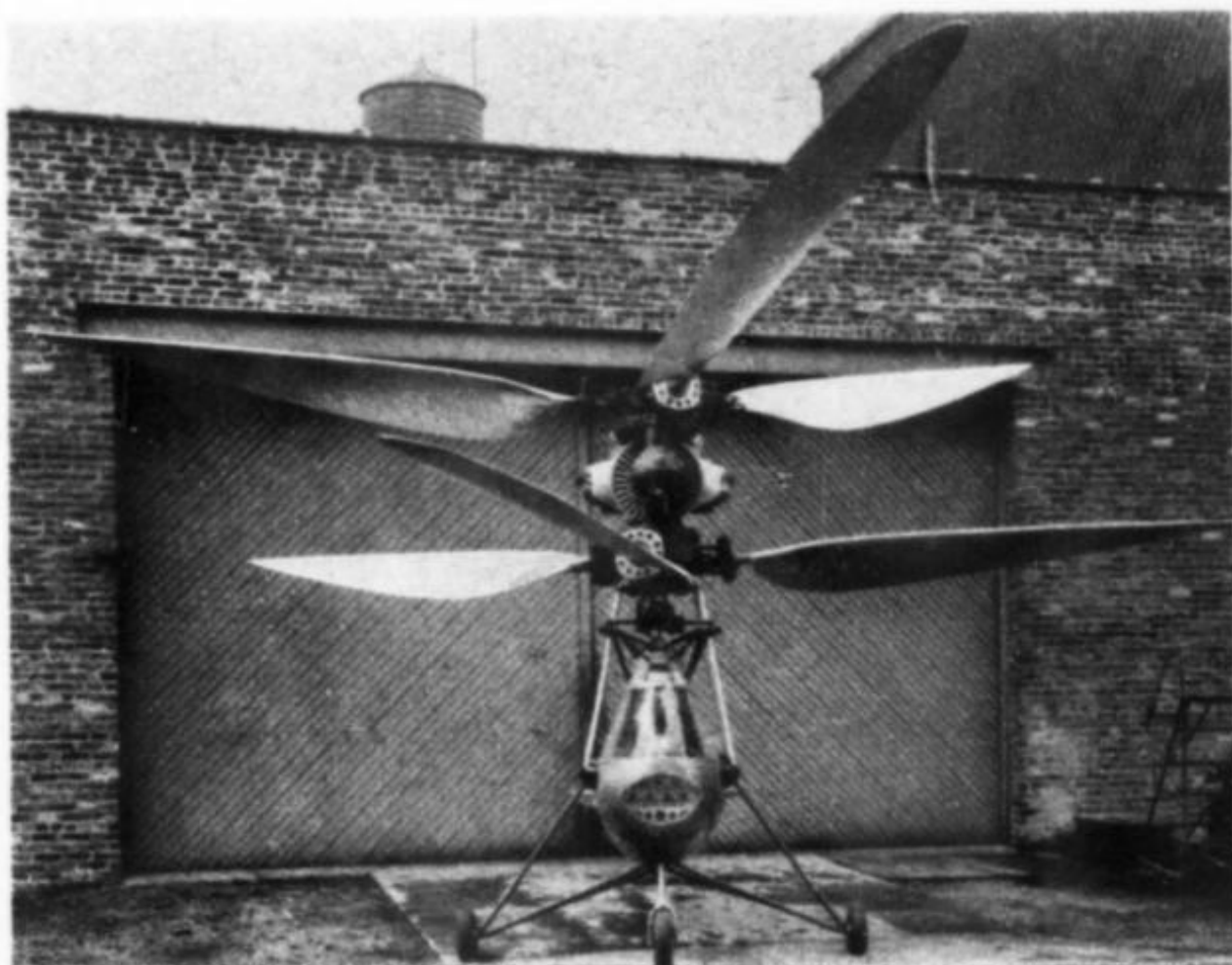
Again and again, a flip of the throttle sent the giant 4-rotored ship rocketing vertically into the air with two, three and even four men aboard. A single rotor taken from the ship, and test-driven by a tiny $\frac{3}{4}$ horsepower motor, lifted 100 pounds. With only 60 horsepower, it lifted 1,500 pounds. So efficient were De Bothezat's amazing airscrews that they were put to scores of uses on the ground as well as in the air. A specially built set, for example, provides the air stream that cools New York's vast Radio City.

The tremendous power of the rotors and propellers that De Bothezat designed sprang from his almost superhuman mathematical sense. The design for the rotor blades of the GB-5 helicopter lately flown at Roosevelt Field did not evolve from sketches, but from a list of figures denoting angles and curves, developed mathematically in the inventor's mind. When De Bothezat saw the completed blades he was pleasantly surprised. "What a beautiful shape they turned out to be," he remarked.

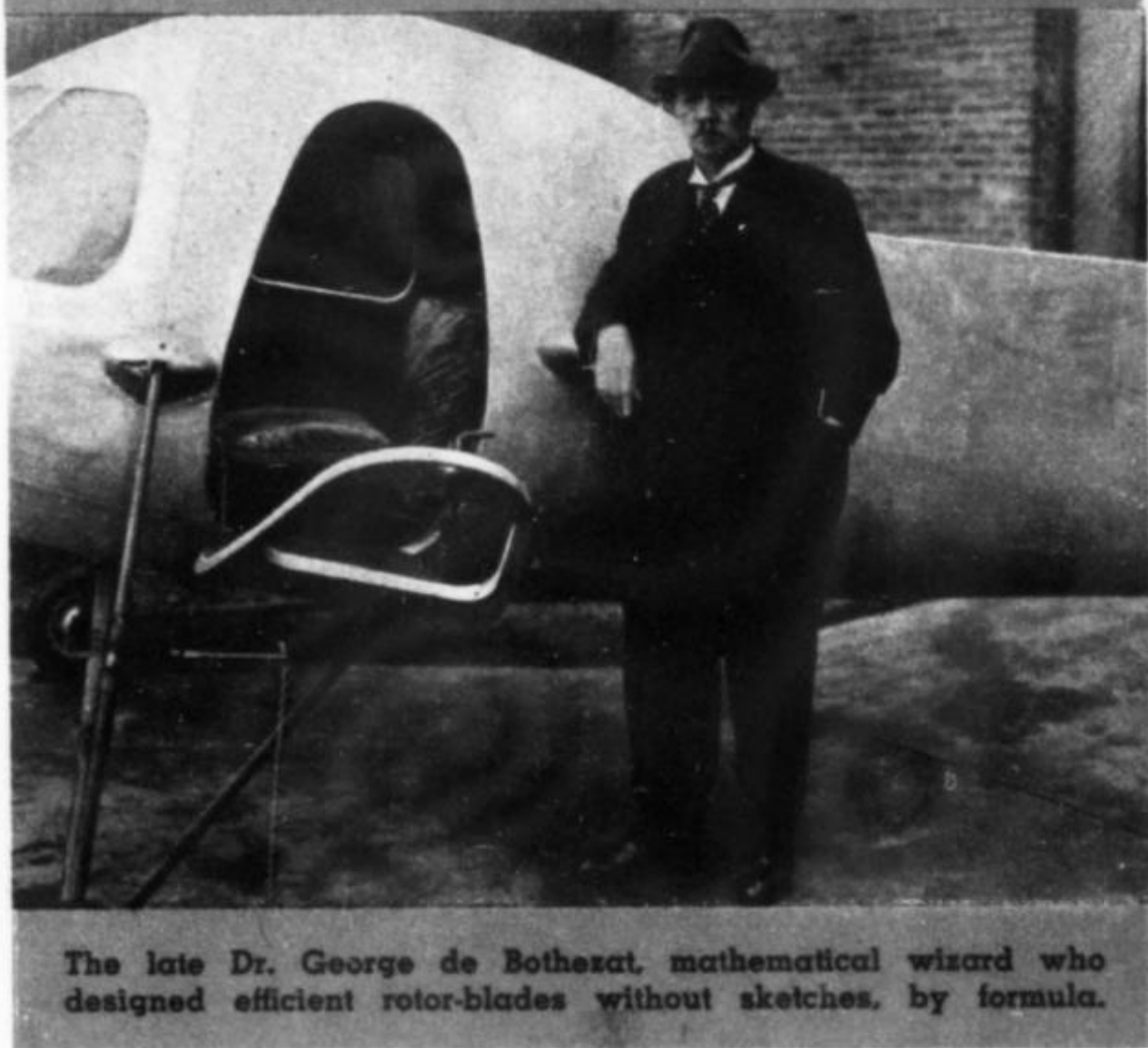
The twin rotors of the all-metal GB-5 are *co-axial*, and turn in opposite directions, one above the other, with the motor between them. The torque effect, or tendency of the rotors to spin the body of the ship is thus equalized—all of the engine power going into the job of driving the lifting rotors. No tail rotor is required for steering or for

counteracting torque. This principle of contra-rotating propellers is seen also in the naval torpedo. Its propellers turn in opposite directions, keeping the torpedo on a steady course, and putting the greatest possible percentage of its motor power into thrust, or push. The fast-climbing De Bothezat GB-5 helicopter might be likened to a flying torpedo with a pilot.

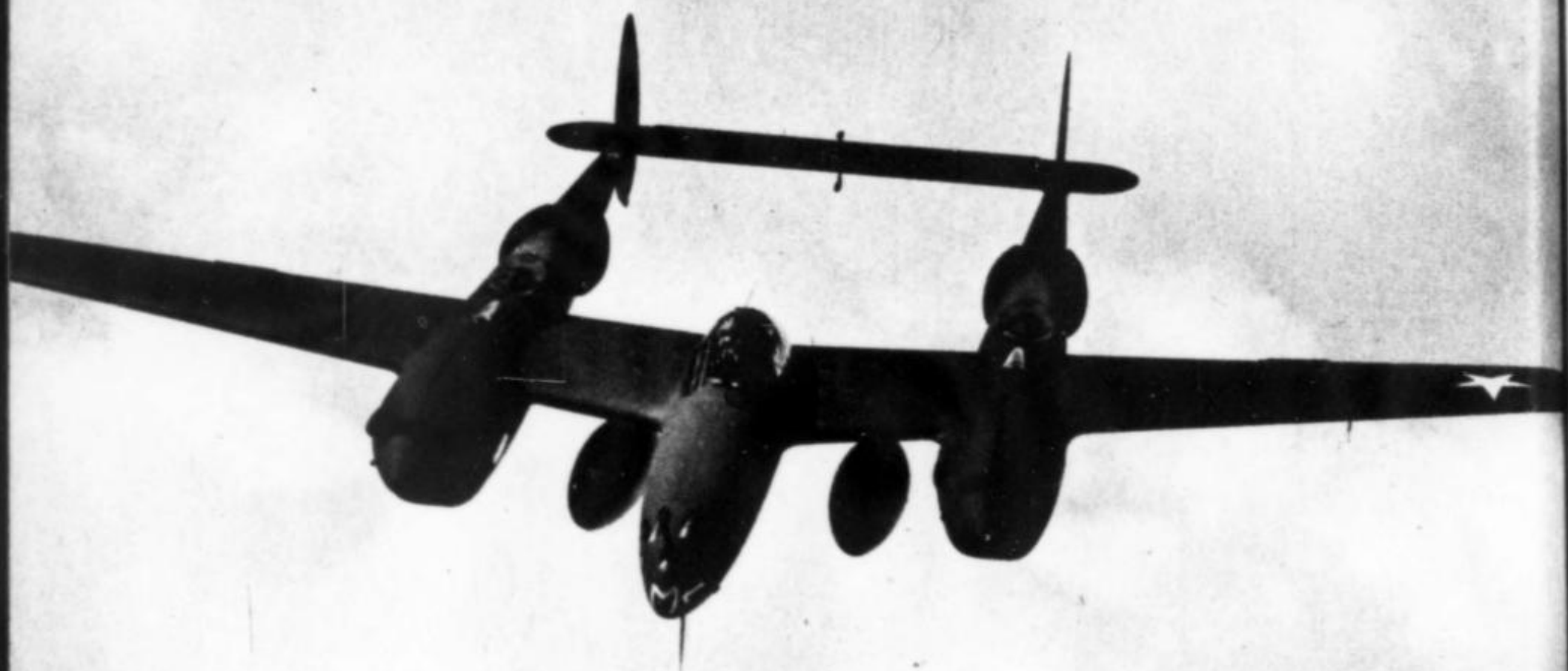
The aluminum-skinned fuselage is a near-perfect streamline. [Continued on page 148]



The latest version of the De Bothezat helicopter, showing the manner in which the motor is set between co-axial rotors.



The late Dr. George de Bothezat, mathematical wizard who designed efficient rotor-blades without sketches, by formula.



SKY-BUSTER

by Darrell Huff and Lawrence N. Eldred

"You give your ship the gun, and with a power no Jap plane can match you surge away. . . . And in a split second it's your guns that are doing the talking."

IMAGINE yourself, for a moment, the pilot of an American fighter plane in battle. Your squadron has just tangled with the Japs. You've shot down one Zero. You've been so busy doing it that you've only just noticed a second one, in the clear, coming down fast at your tail with all his guns spitting. You're in a tight spot.

You know, without having to think about it, that your plane is much heavier than the Jap's. You know, even as he gets the range and his bullets begin to punch a pattern in your wings, that it can take a lot of punishment. But you know it can't take as much punishment as that Jap can dish out. You need power, plenty of power, and you need it fast.

At that moment a man named Thomas Midgley, sitting in a wheelchair thousands of miles away, reaches out to help you. You give your ship the gun, and with a power no Jap plane can match you surge away out of that hole you were in. Still with the help of that distant man in the wheelchair you slam

your ship up and over. And in a split second it's you who are on top of the Jap, and it's your guns that are doing the talking. And you know that Jap will never get away.

You know, because the Jap hasn't enough power to turn the tables as you were able to do. And it was Thomas Midgley who gave you that power, who could tell you of more than 15 years of work, and \$3,000,000, that went into its development.

For the power that saved you was delivered by the superfuel in your gas tank, and Midgley is the man who developed tetraethyl lead. A teaspoonful of that in an airplane's fuel supply is enough to make the difference between victory and the downward swirl of smoke and flame that means defeat.

It was along about 1920 that engineers began to worry hard about giving gasoline engines more power. They knew this could be accomplished by speeding up the engine—or by increasing the compression ratio. But . . .

Speed up an engine and it costs you too

much.
develo
pieces.
mobile
thousa
could

Tha
somet
out re
and n

Tha
head
tion, l
Ket"
order

"Fi
what
engin

Nov
scien
thing
in th
burea
assist
years

Th
scien
pig.
cylin
unsu
hole
put a



10¢ MECHANIX ILLUSTRATED

AUGUST

NSC



AIRACOBRA NIGHT FIGHTER

BUILD A MODEL
M-3 TANK
SEE PAGE 112

NEW WEAPON CAN END THE WAR IN TWO MONTHS

Says J. Walter Christie, World's
Most Famous Designer of Tanks

MECHANIX ILLUSTRATED

W. H. FAWCETT, Jr., President

Editors: Roland Cueva Bill Williams

Associate Editors: George Daniels, Aviation; Norman C. Lipton, Photography; Charles D. Bonsted, News; Shirley Cutter, Production

Copyright 1942 by Fawcett Publications, Inc.

SPECIAL FEATURES

On the cover: The Bell Airacobra in a fighting mood with its powerful wing-edge guns and propeller cannon in night action.—Photo courtesy Synthene Corp.

The Art of Japanese Warfare - - - - -	35
By Capt. Charles A. Borden	
By Air to Alaska - - - - -	39
By Mandus E. Bridston	
Are You a "Freudy-Cat?" - - - - -	40
By Louis Hochman	
A Big Gun for Planes - - - - -	44
Now—Power from Sunshine! - - - - -	46
By Myron Weiss	
Keep the Old Bus Rolling! - - - - -	50
By Frederick C. Russell	
This Weapon Could End the War in Two Months - - - - -	52
Says J. Walter Christie, famed tank inventor, in an interview by George E. Daniels	
Enemy Spies! - - - - -	58
Transocean Panzer Units - - - - -	60
By Jacques Martial and Robert C. Scull, Industrial Designers	
Can You Do It? - - - - -	64
By Roy Lester	
Winged Death from the Deep - - - - -	68
By Rod A. Emery	
Gunners Up! - - - - -	70
By F/O John L. Scherer, R.C.A.F.	
The Wonderful Tom Swift - - - - -	74
By W. M. Kimball	
54 pages of Hobbies and How-to-Builds	

starting on 93

(Continued on page 6)

THE MECHANICS ILLUSTRATED ADVISORY INVENTIONS BOARD

WILBUR SHAW

Noted automotive engineer and
inventor

CLYDE PANGBORN

Aviation pioneer

DR. LOUIS D. CLEMENT

Noted physicist, chemist and
inventor

SIR HUBERT WILKINS

Scientist and explorer

DR. JAMES L. CLARK

Explorer and Assistant Curator of
the American Museum of
Natural History

CAPTAIN BOB BARTLETT

Explorer

ROBERT COLES

Noted astronomer, Assistant
Curator of the Hayden Planetarium

NEXT MONTH!

Famed for years among air-minded Americans for his forward-looking aircraft designs, Major Alexander P. de Seversky last spring published *Victory Through Air Power* in which he set forth for every citizen the fabulous possibilities of global air power which, he charges, many of those now directing the U. S. air program still fail to grasp. A sensation on all sides, the critical, prophetic book leaped to the best-seller list, stayed there for weeks. Now Major de Seversky speaks out again in an article, *The Plane of Tomorrow*, in next month's issue of MECHANIX ILLUSTRATED. It is, we venture, the most important and significant discussion it has ever been our good fortune to bring to MI readers. To be sure not to miss it, reserve your copy of the September issue NOW!

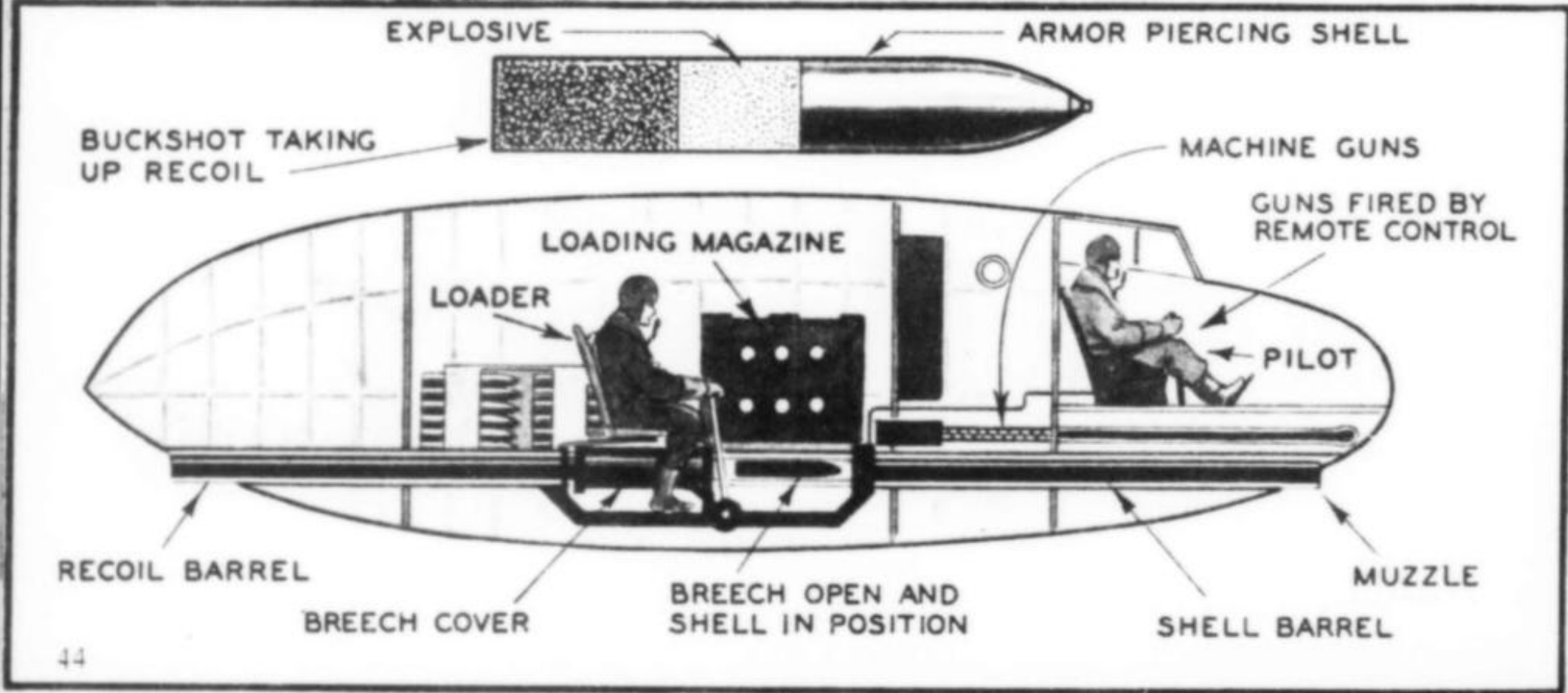


MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1942 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 10c per copy. Subscription price \$1.00 per year in U. S. and possessions. Canadian subscriptions not accepted. Foreign subscriptions \$2.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS



MECHANIX ILLUSTRATED drawing
by Reynold C. Anderson



A Big Gun For Planes



M ECHANIX ILLUSTRATED presents herewith what it believes might be a valuable and practical suggestion for a method of mounting a deadly big gun in a plane.

At present, the armament of planes is limited to 20 mm. and an occasional 37 mm. cannon, because cannons of larger calibre have too great a recoil for a plane.

In World War I a large number of three-inch (approximately 75 mm.) guns known as Davis non-recoil guns were manufactured in America. The Davis gun was specifically designed for use on aircraft, but was finally ruled out because the then-exposed position of gunmountings on planes made it difficult to operate. But a modernized version such as MECHANIX ILLUSTRATED offers here might very well have great possibilities today.

Principle of the gun is essentially simple: a common breech is situated between two barrels, one rifled for the shell, the rear one designed for a simultaneous discharge of buckshot that will cancel out the recoil from the forward explosion. The buckshot offers more frictional resistance than the solid shell passing up the rifled barrel, forces the shell outwards, and itself disperses within a few yards beyond the rear end of the gun.

TRANSOCEAN PANZER

by Jacques Martial and Robert C. Scull

Industrial Designers

IN THE foggy summer dawn of the North Sea, a fleet of 100 armored ferries slips up to the coast of Denmark. Four miles off shore, the invasion fleet is spotted for the first time by Nazi defenses. Guns from Nazi *flak* ships and shore artillery open up with a roar. An answering roar from the armored ferries returns the fire.

The assault ferries, which had been riding low in the water, now approached the shoal waters off the shore. Suddenly pumps aboard them began throbbing and streams of water poured out of the sides of the ferries as they quickly emptied ballast tanks. The ferries rose from the water, like submarines surfacing, and lightened of their ballast, streaked for the beach. With their ballast tanks emptied, they now drew less than six feet of water.

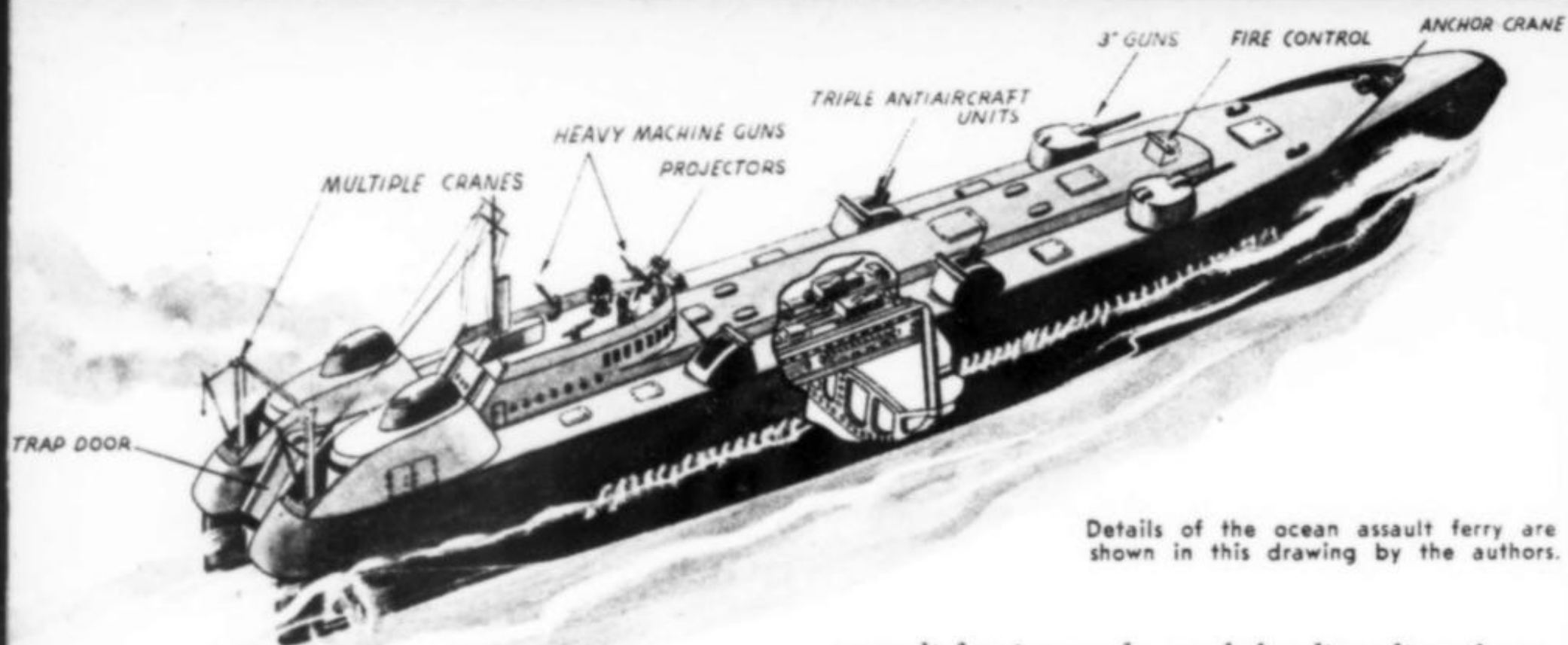
Skimming across the surface of the sea, their guns blazing, the



ER UNITS

Martial & Scull, well-known industrial designers, present
a new assault ferry designed for an invasion of Germany.





Details of the ocean assault ferry are shown in this drawing by the authors.

assault ferries made crash landing directly on the beach. Instantly, huge trap doors in their bows opened out and down and streams of tanks, motorized marines, gun carriers and other equipment vomited out onto the shore, using the trapdoors as landing gangplanks.

Multiple anti-aircraft guns atop the ferries spit a hail of lead upward to ward off Nazi dive bombers. In a few moments, troops had established a beach head.

* * *



Jacques Martial

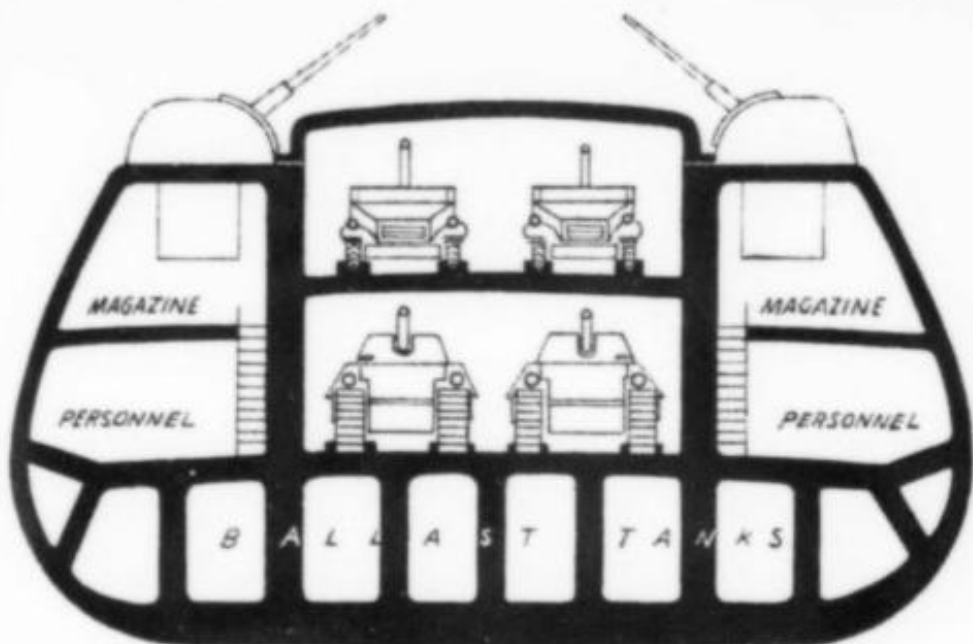


Robert C. Scull

ABOUT THE AUTHORS

Jacques Martial and Robert C. Scull are the principals of the New York industrial designing firm of Martial & Scull who have become famed for the functional and modern streamlining of a number of industrial products. If you have an electric clock, the chances are it is of Martial & Scull design, for they designed such clocks for General Electric and Telechron. They have designed other things ranging in size from streamlined pen and pencil sets (for the Esterbrook Pen Co.) to observation cars for crack trans-continental streamlined trains.

Mr. Martial is a native of France, having spent five years in the French Army in World War I. He came to America shortly after the first war. Mr. Scull is a former college instructor of industrial design, schooled in engineering and advertising. In recent months, they have devoted much of their time to the design of new types of weapons and ships.



MARTIAL & SCULL INDUSTRIAL DESIGNERS, NEW-YORK.

The assault ferry's ballast tanks are shown in cross-section.

Such might well be a description of the invasion of Nazi Europe by United Nations forces if an assault ferry such as we have designed especially for **MECHANIX ILLUSTRATED** were adopted by the Army and Navy.

At the time this was written, no successful invasion of Nazi Europe had occurred, other than British Commando raids upon the coast. One reason no such invasion had been made was the fact that, up until this time, no nation had as yet perfected a technique of landing heavy armored forces necessary for blitz warfare in the face of well equipped shore defenses.

True, the Japanese had demonstrated a highly successful technique for landing light forces upon hostile coasts—but all of their initial successes were made against coasts which were lightly defended. (For a diagram of the Japanese basic plan for shore assaults, see page 34.) It is very doubtful that the Japanese attack could succeed against a properly defended coast line. And, too, the Japanese have not yet devised a method of landing anything but very light equipment. Certainly, the Japanese methods could not be turned successfully against the powerful Nazis unless the German strongholds had first been much more seriously weakened than they are at the present writing.

The easiest way to invade Europe is by means of some new weapon which will land medium or heavy tanks, a full complement of motorized equipment and a fully equipped force of soldiers on those shores. We sincerely believe we have created a special-type ocean ferry which will perform this feat.

The accompanying illustrations show the principal features of the assault ferry which we have designed. Its chief feature—and its

Announcing

The **MECHANIX ILLUSTRATED** ADVISORY INVENTIONS BOARD

WILBUR SHAW—Noted automotive engineer and inventor.

CLYDE PANGBORN—Aviation pioneer.

DR. LOUIS D. CLEMENT—Physicist, chemist and inventor.

SIR HUBERT WILKINS—Scientist and explorer.

DR. JAMES L. CLARK—Explorer and Ass't. Curator of American Museum of Natural History.

CAPTAIN BOB BARTLETT—Explorer.

ROBERT COLES—Noted astronomer and Ass't. Curator of the Hayden Planetarium.

The distinguished men listed above have consented to serve as an Advisory Inventions Board for **MECHANIX ILLUSTRATED** for the duration of the war and during the making of the peace. They join in urging all readers of this magazine to exert their ingenuity to the utmost at the present time to produce ideas which will help America gain victory. Such new ideas as the one presented in the accompanying article are needed **NOW**.

Among the readers of **MECHANIX ILLUSTRATED** there may be one man who is capable of producing one idea, one invention which will be a decisive factor in winning the war. This Board of famous scientists urges you to use your ingenuity toward this end *immediately*. Send your inventions and ideas to Washington! At once!

most radical point—is the use of ballast tanks very similar to those used by a submarine for submerging. Since this boat is essentially a ferry—much like river and bay ferries used in civilian life—we have added the ballast tanks to give it the necessary stability for an ocean crossing.

The tonnage of this ship could vary and should be determined after its load capacity is decided. However, it should be capable of crossing any ocean at a cruising speed of at least 16 knots when fully loaded, and 20 knots or more when ballast tanks are emptied preparatory to the beaching operation. It should be able to carry directly to the point of attack a self operating unit of a minimum of 8 medium tanks, 4 halftrack trucks mounting 75 mm. guns, 4 self [Continued on page 152]

Winged Death from the Deep



Submarine aircraft hangars lack the vulnerability of surface carriers, could sneak close to objectives with 12-18 bombers.

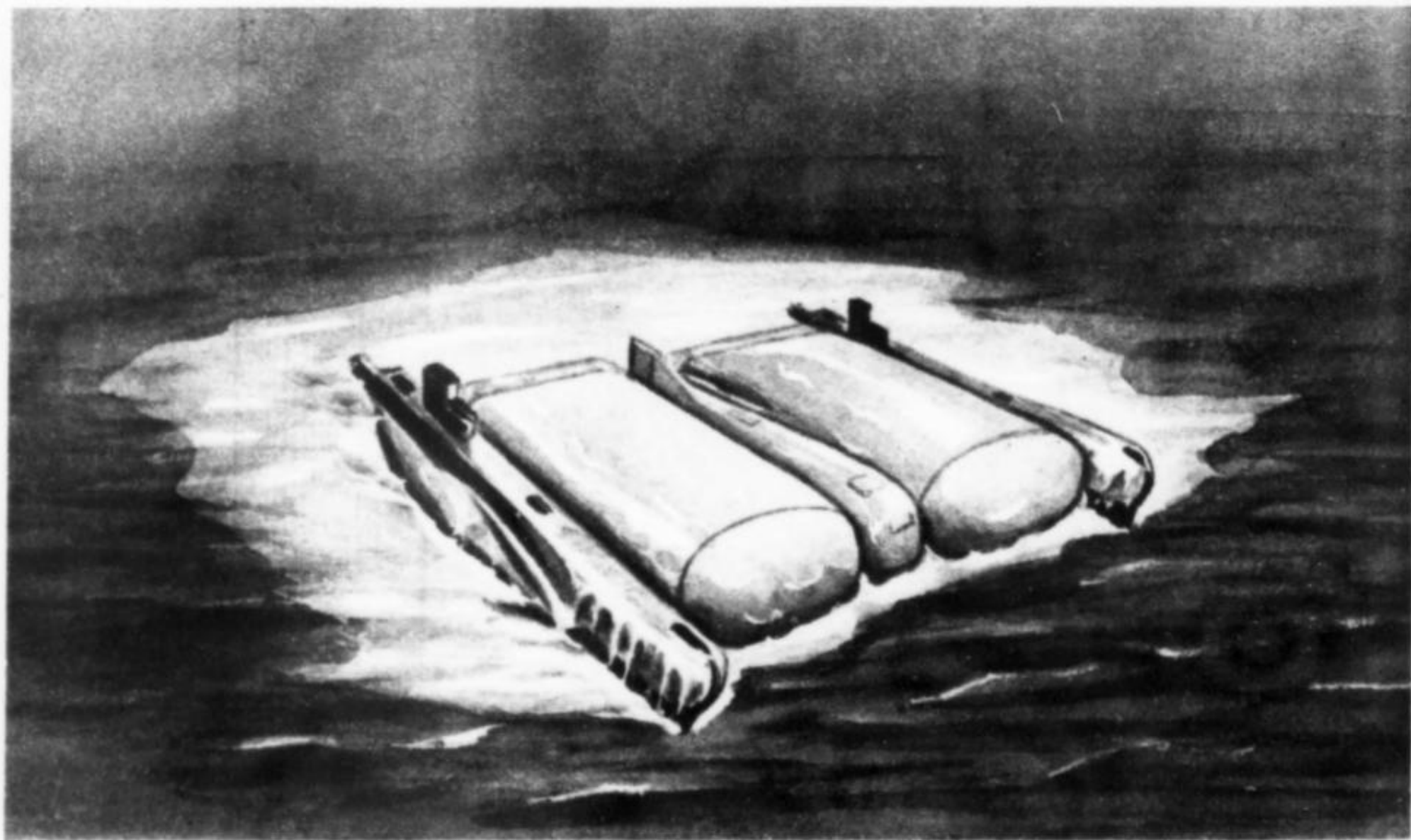
Submarine aircraft carriers have actually been built. That at left, Britain's M-2, indicates a development which Mr. Emery has logically extended.

WITH every day's war news reports bringing new evidence that victory will come about only through the superiority of our air power, serious consideration is being given to the proposal we build an armada of a revolutionary type of submarine aircraft carrier. The form this might take is shown in these drawings.

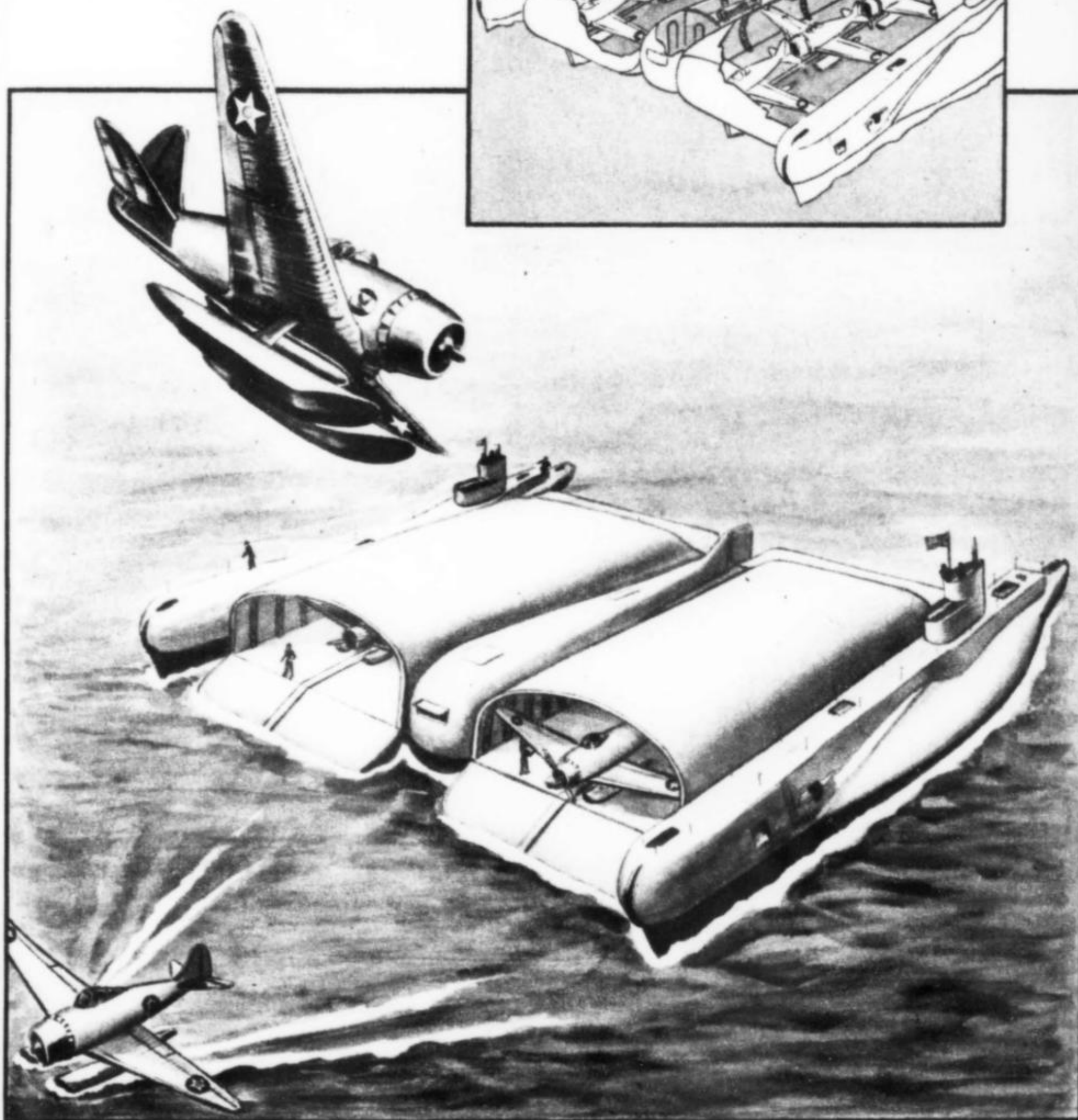
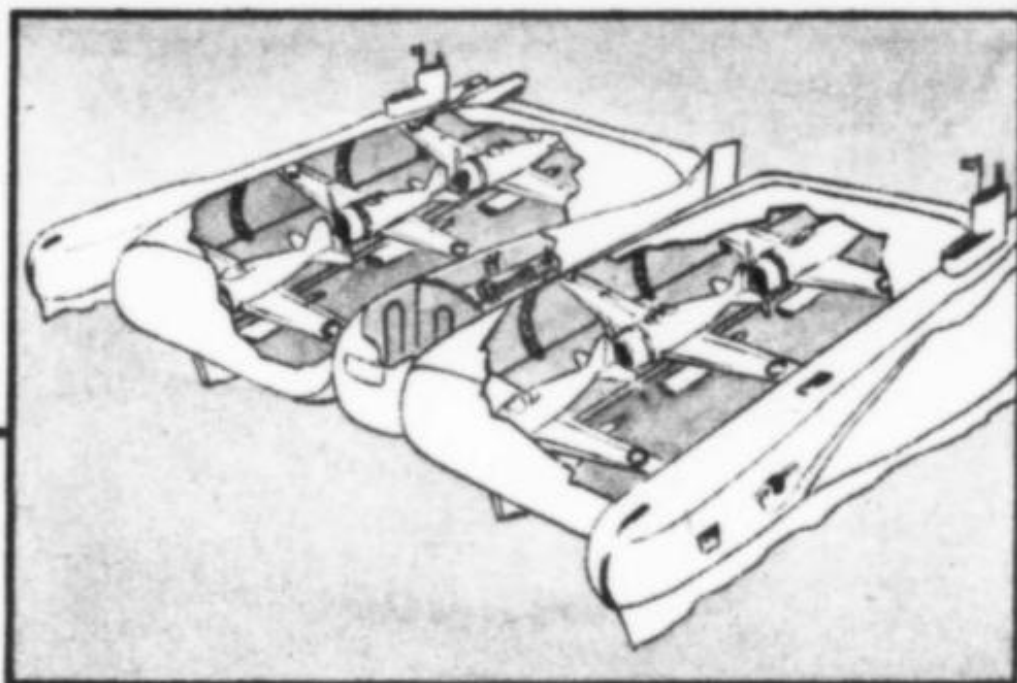
The design is a logical extension of such small beginnings as the single-plane chamber

which has been experimentally and successfully added to submarines in a number of cases (see photograph this page). Two shell-like structures of steel hold six planes of the rigid-wing type (as many as 18 of the folding-wing kind could be stored), flanking a whale-shaped unit containing plane supplies and quarters for personnel not otherwise accommodated. The subs proper resemble the conventional type in many respects, but of course

Mr. Emery's double shell-like underwater hangar would look like this as it surfaces in readiness to release bombers.



by Rod A. Emery



Hangar doors let down to become ramps down which the pontooned bombers slide for take-off. Above, cut-away view.

are vastly more powerful in submerging and maneuvering.

Of special steel alloys and uniquely braced to withstand undersea pressures, the hangars drop their rounded-front doors upon surfacing to form ramps for lowering pontoon-equipped fighter or bomber monoplanes.

Advantage of such a revolutionary-type craft are many and obvious. They do not have the vulnerability of familiar war vessels

and especially aircraft carriers. The latter type's broad deck and complex machinery have made them discouragingly susceptible to air attack, as sinkings on both sides already have now decisively proved. The submarine carrier overcomes those disadvantages, and can sneak close to objectives with a cache of planes with load devoted to bombs. Heavy extra supplies of gas would not be needed for a long flight from the home base, as now.



"Turtle troops" withdraw into shells, fleeing tornado, reaper.

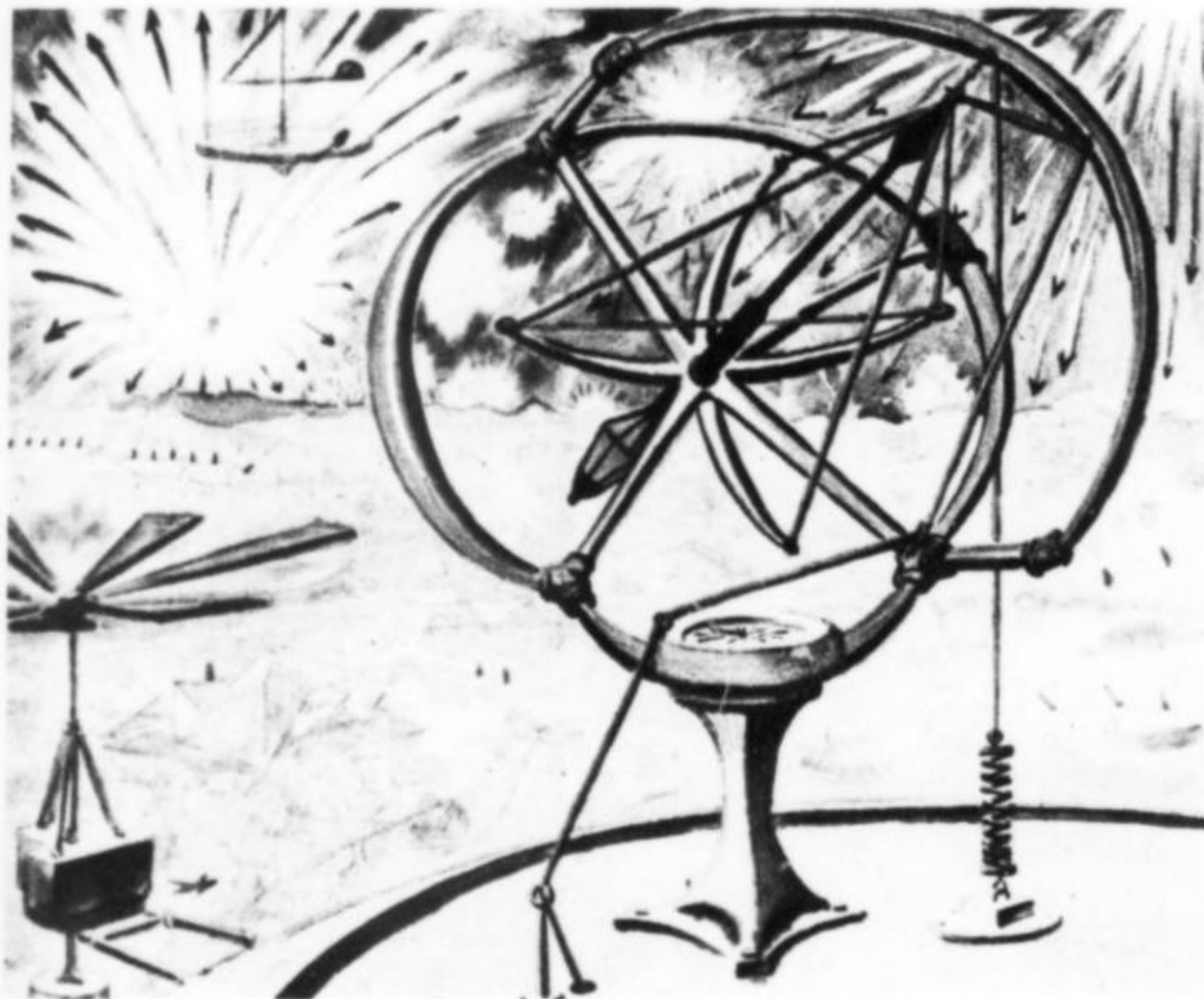
Tomorrow--

MECHANISTIC MONSTERS?

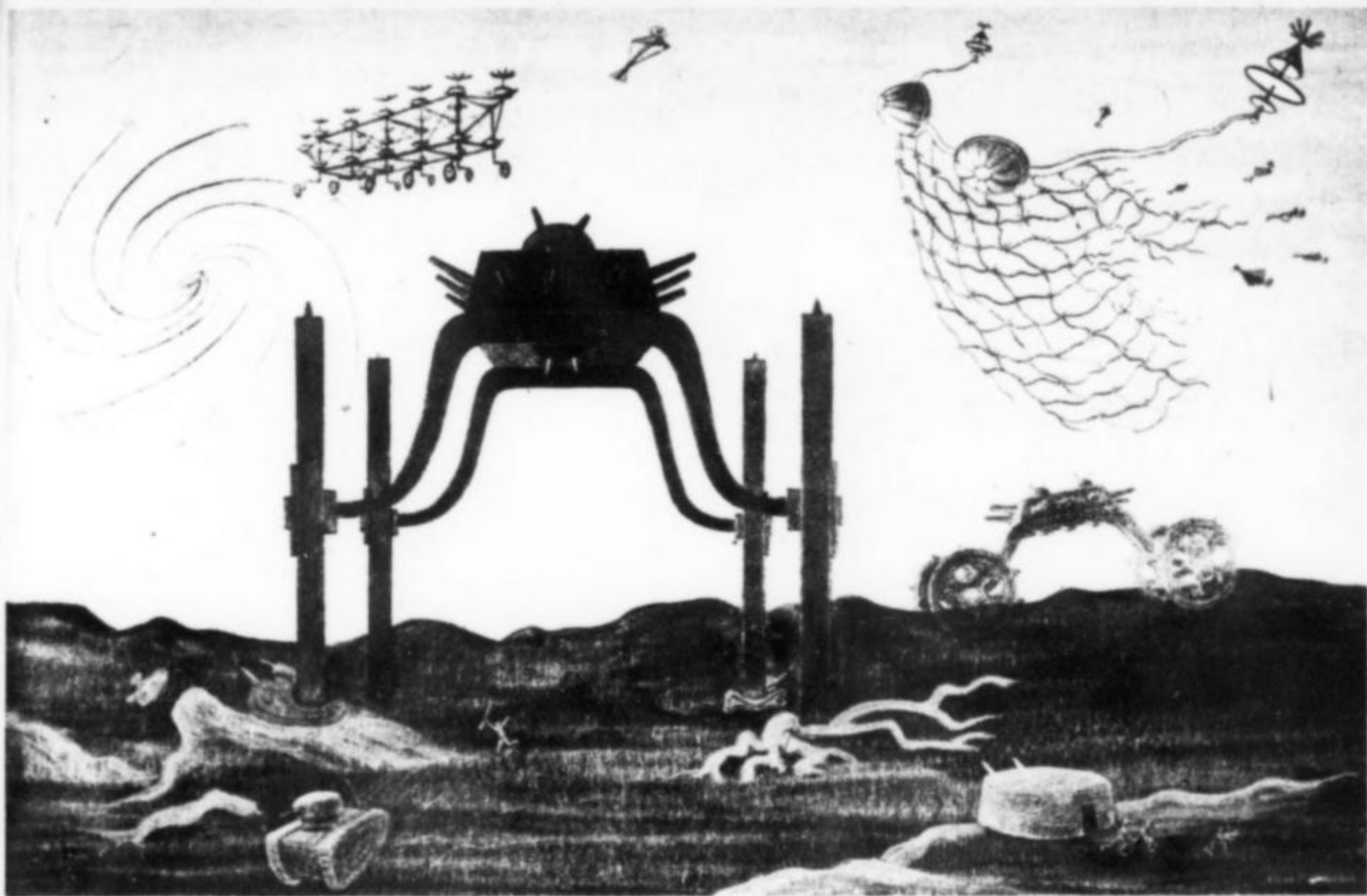
SPIRED by surrealism, and out of nightmares with antecedents in the terrors of mechanized war, are these deadly monster-like machines with electrical, if any, souls. They're the dread offspring of an apparently tortured but technically ingenious imagination—that of artist Clay

Spohn of California, who put them on canvas in the last year or so. The San Francisco Museum of Art exhibited these four and others recently under the title "Fantastic War Machines and Guer-ragraphs."

A bombproof plastic shell into which the soldier can withdraw, tortoise-like, is suggested by Spohn in one painting (top, page 90) in which attack comes from a terrifying man-made tornado and a sky-reaper—a plane trailing bombs on



Dart-bomber hurls shells which burst and scatter others.

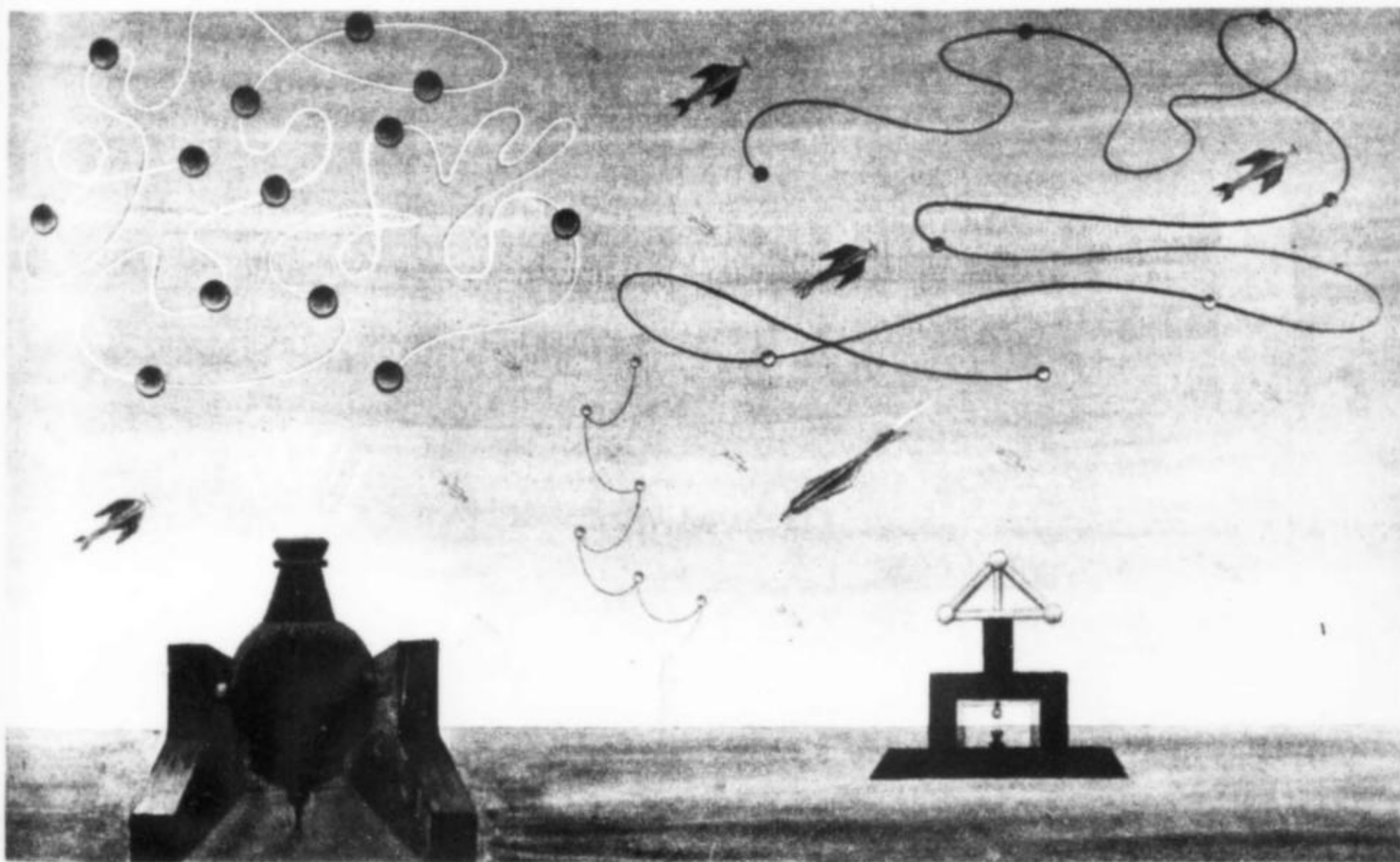


Tough on aviators—bolo-like trap hurled aloft by a cannon.

long cables. Spohn's dart-bomber (bottom, page 90) uses the principle of the bow and arrow in a mechanical device which hurls rocket bomb shells. They burst in the sky like fatal fireworks, scattering small bombs.

No tank or pillbox could withstand this gigantic rolling fort.

Doubtless impractical but still a diabolical possibility, according to the artist, is an immense rolling fort (top this page) with giant wheels that would crush any obstacle like a tank or pillbox fort. In the same painting Spohn shows flying [Continued on page 160]



August, 1942

MECHANIX ILLUSTRATED

JANUARY

MORE PAGES

ONLY
20¢

EXTACHROME

HOW TO DEVELOP THIS
NEW COLOR FILM IN YOUR
OWN DARKROOM • PAGE 107

mechanix illustrated

Title Registered U. S. Patent Office

A Fawcett Publication

W. H. FAWCETT, Jr., President

ROGER FAWCETT, General Manager

RALPH DAIGH, Editorial Director

ROBERT HERTZBERG, Executive Editor

GILBERT PAUST, Feature Editor

LARRY EISINGER, Crafts & Hobbies Editor

ED RICHTSCHEIDT, Art Editor

JO McCALLION, In Charge of Production

Associate Editors: HARRY BATES

WAYNE AMOS

ROBERT BRIGHTMAN

WILLIAM E. DUGGAN

JANUARY, 1947

VOL. XXXVII, No. 3

On the cover: Color photo by Stan Mangione

SPECIAL FEATURES

- Navy Tackles Mt. Everest
by Captain J. H. Korb, USN 49
Men live in a chamber at high "altitudes"
- Hottest Thing in Industry
by Lester David 52
High frequency radio speeds many jobs
- Electrons Go to Bed 56
You won't shiver under an electronic blanket
- Down Goes Piccard! 58
His goal—the ocean floor, four miles below
- Gimmicks for Clowns 62
The funny men need funny props
- How Good Are the Foreign Cars?
by Tom McCahill 65
The two sides of an ever-hot argument
- Bank Your Furniture
by Don Romero 69
You can have a furniture vault all your own
- Ice Cracker
by Logan Reavis 72
This ship's sole job is to crack ice
- Ace in the Sky 74
The British develop a one-control plane
- Teleran = Television + Radar 76
Pilots can use radar that's on the ground
- Model Airliner de Luxe 79
The Boeing Stratocruiser in miniature
- PTM—Wonder Wave of Radio
by Gold V. Sanders 80
Programs will be multiplied

- Pinwheel Bus 83
The helicopter is a natural as a bus
- Candid Pickups 86
Make a collection of sound recordings
- Science in Pictures 88
- In League with the Devil
by Louis Hochman 97
Count Walewski deals in devils
- Bow and Arrow for Boar 102
A wild boar is nothing to fool around with
- Ski Patrol
by Edward Kelly 104
Patrolmen lessen the dangers of the ski trails
- New Color Film
by Robert Brightman 107
MI reports on Ektachrome
- Split-tail Bonanza
by C. B. Colby 111
This plane is controlled by "ruddervators"
- Editor's Workbench 10
- Invention Clinic 20
- ## CRAFTS AND HOBBIES
- Cardboard Archery Target 113
A novel method of target making
- Removable Washtub Cabinet 114
How to disguise the eyesore in the basement
- A Slotting Attachment for the Lathe 116
[Continued on page 6]

Copyright 1947 by Fawcett Publications, Inc.

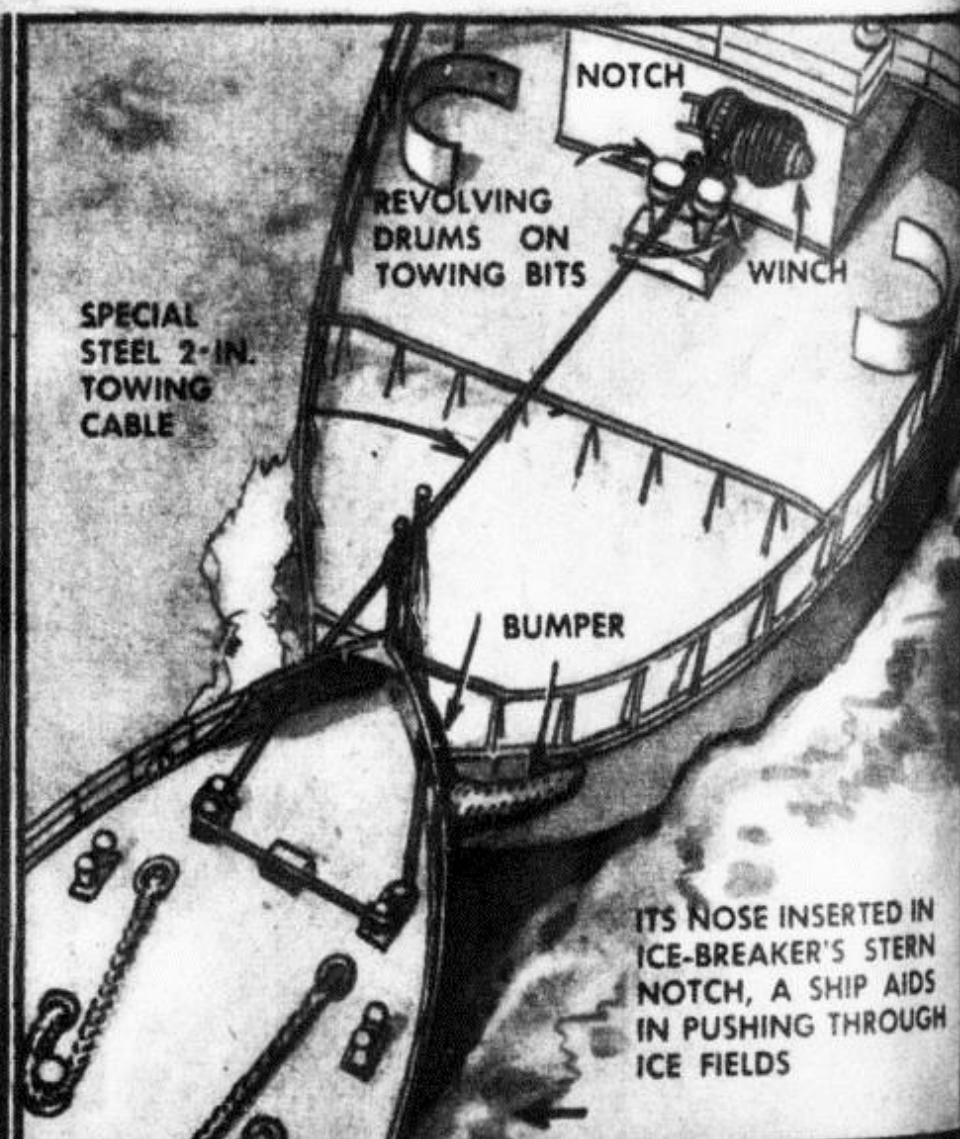
MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 22 West Putnam Avenue, Greenwich, Conn. Printed in U. S. A. Advertising offices, 295 Madison Ave., N. Y. 17, N. Y. Editorial Offices, Paramount Building, 1501 Broadway, New York 18, N. Y. West Coast Representatives: Los Angeles, H. P. Houston, Edward S. Townsend Co., 645 S. Flower St.; San Francisco, Edward S. Townsend, Edward S. Townsend Co., Russ Building. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Allen E. Norman, Secretary; Gordon Fawcett, Treasurer; Al Allard, Art Director. Entered as second-class matter at the post office at Greenwich, Conn., under the act of March 3, 1879. Additional entry at Louisville, Ky. Copyright 1946 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to MECHANIX ILLUSTRATED, 347 Madison Ave., New York 17, N. Y. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to Circulation Department, 22 West Putnam Avenue, Greenwich, Conn. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 20c per copy. Subscription price \$2.40 per year in Canada, the United States and possessions. Foreign subscriptions \$3.15 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds, payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

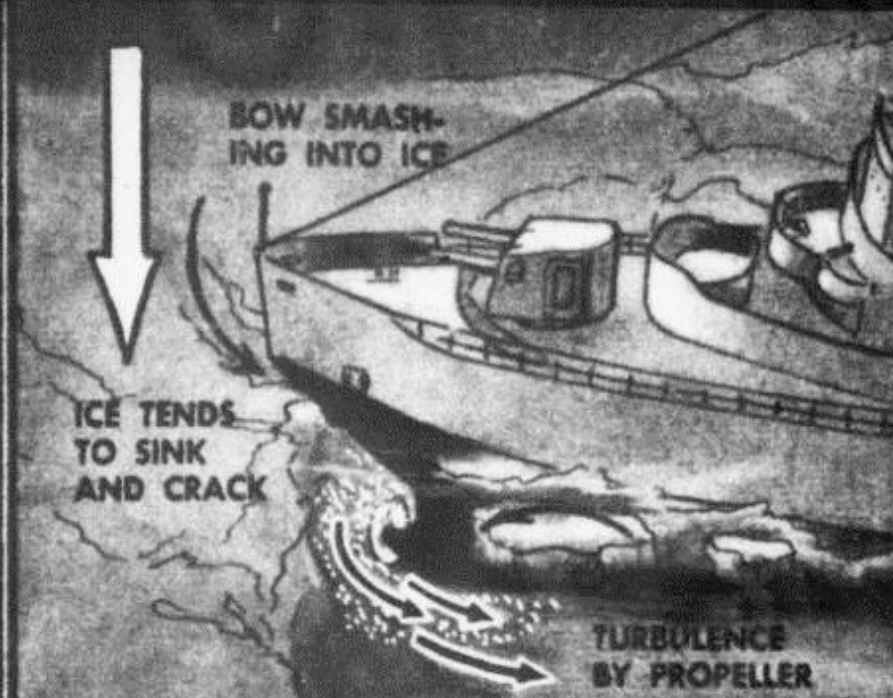
Ice



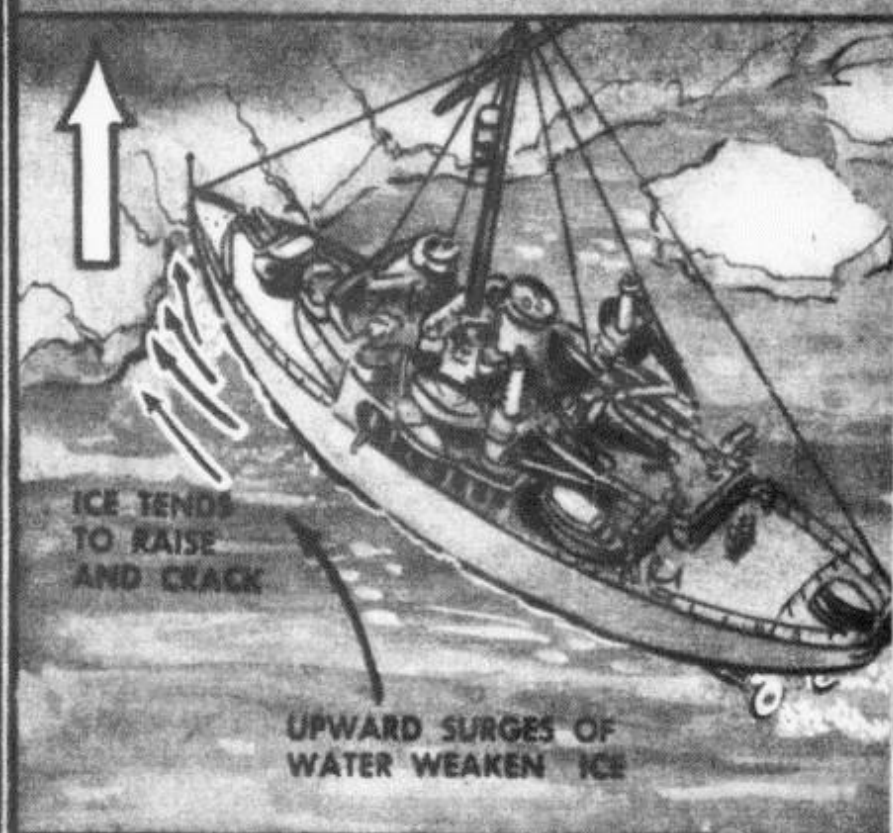
IT CRUSHES through the frozen harbor like an ice-eating behemoth, rolling from side to side as 240 tons of water shift from port to starboard and back again. Two giant propellers drive the monster forward, while a bow propeller churns beneath the surface, drawing water from under the ice flow causing it to sink and crack. If progress halts, the nose propeller reverses action and drives water upward, lifting and breaking the ice. And if need be, the ice cracker can even lift its massive bow and bring down a crashing blow. Developed by the Coast Guard, the ice cracker fumes and growls around the ice-bound harbor. In its wake, ships move again, trade and commerce—thanks to science—resume.



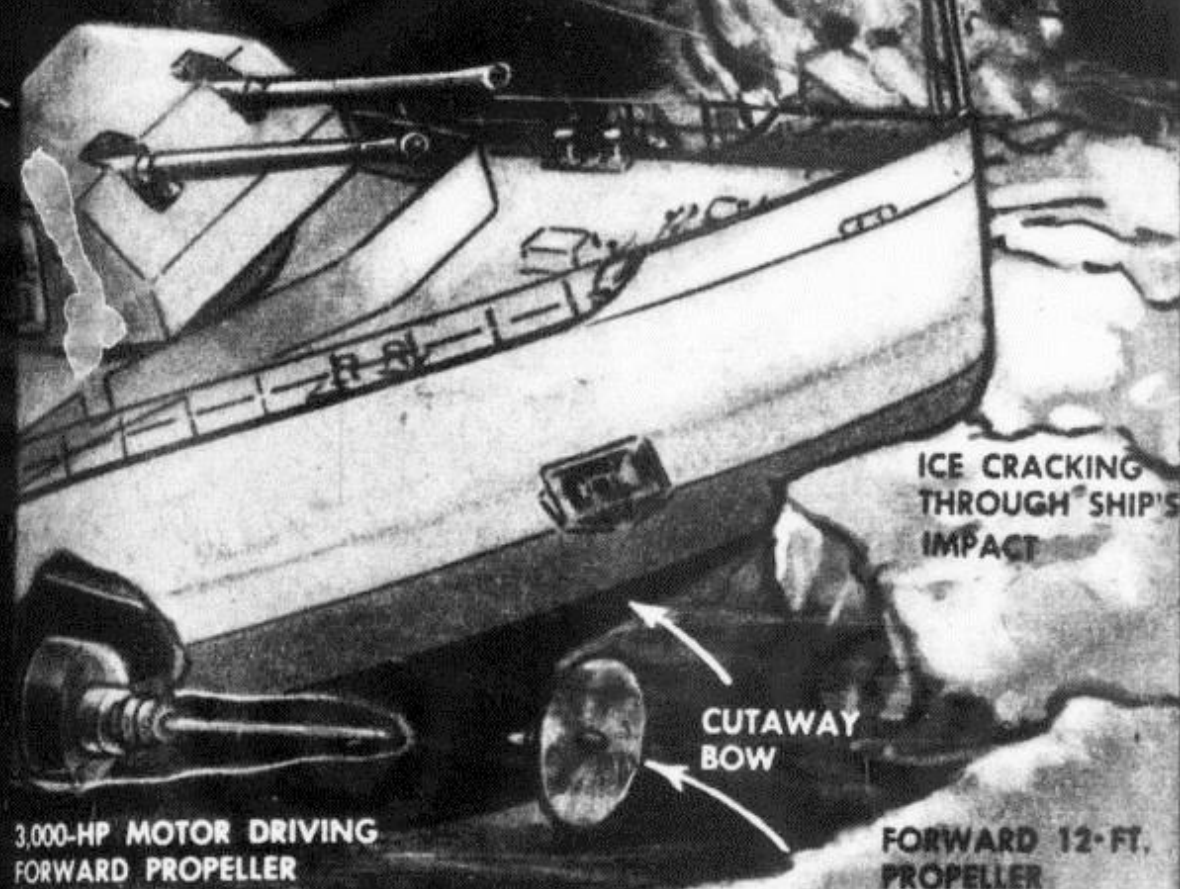
Cracker



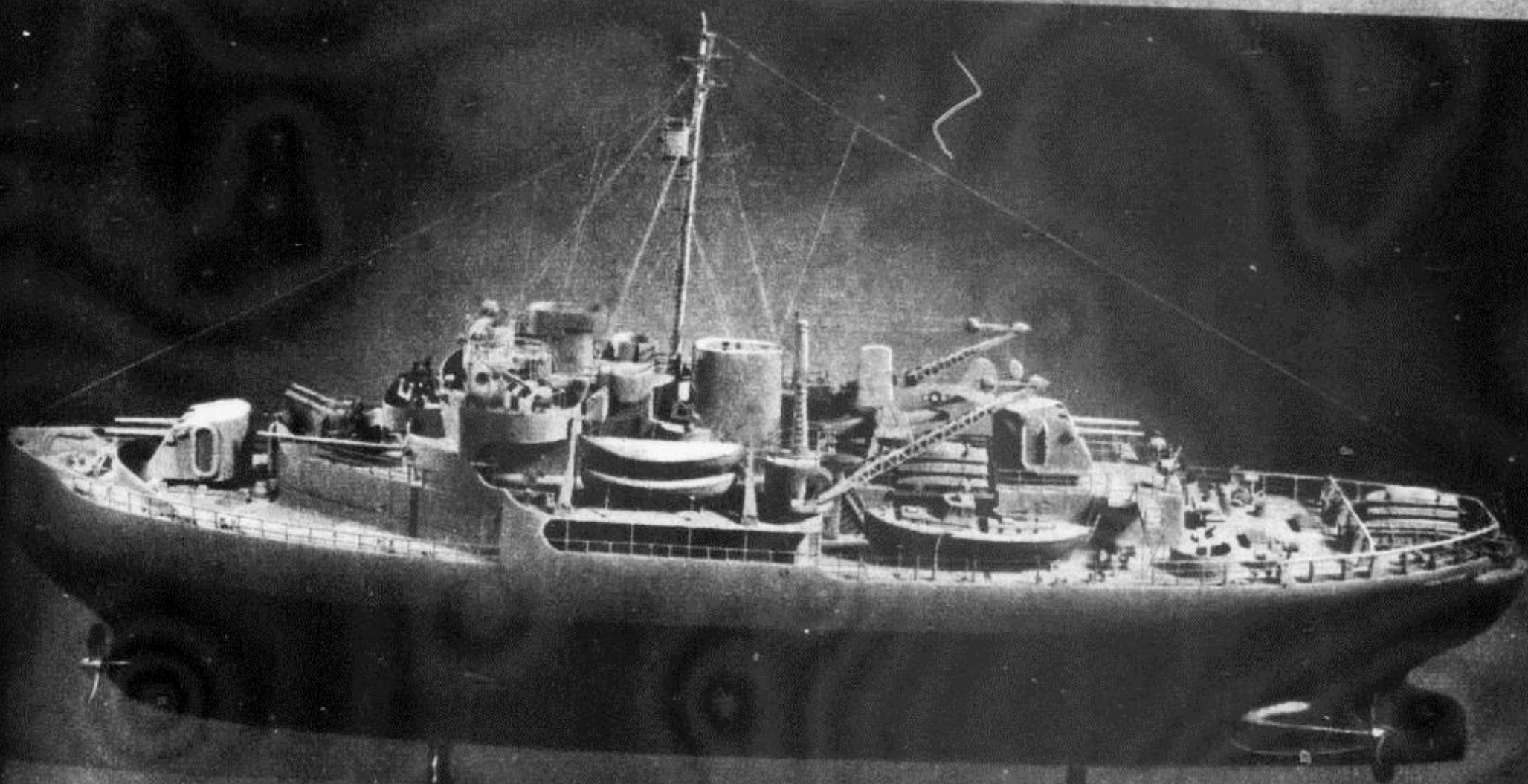
The powerful 12-foot forward propeller draws water from under the ice flow, causing it to sink and crack . . .



. . . or, above, it can reverse action and drive water upward, lifting and breaking the ice jam. Model is shown below.



A WIND CLASS ICE-BREAKER IN ACTION.
OVERALL LENGTH, 269 FT.; BEAM, 64 FT.



MECHANIX ILLUSTRATED[©]

20¢
MARCH

DAYTON PUBLIC LIBRARY
REFERENCE
2ND FLOOR
FEB 10 '52

MI's Custom-Built
Catamaran Cruiser
See Page 66

David Lockman

McCAHILL TESTS THE SENSATIONAL NEW LINCOLN
AVE FUN WITH AN EASY-TO-BUILD LIE DETECTOR

MECHANIX ILLUSTRATED

SPECIAL FEATURES

The Con Men Will Get You	Harry Kursh	59
It Takes Spunk To Spelunk	Hugh Kingsley	62
Cat Comes Back . David Lockhart and John G. Kingdon		66
First Car Across The U.S.A.	Tom Mahoney	70
Tree Banking Pays Off	Robert M. Hyatt	74
Cellarful Of Railroad	Art Henry	82
Mothballing Your Rifle	Raymond R. Camp	96

TOM McCAHILL TESTS

'53 Lincoln	88
'53 Mercury	92

REGULAR FEATURES

New In Science	72
MMI: He Makes Merrymakers	H. W. Kellick 78
Prize Gadget: Pocket Electroplater	85
Pin-Up Car	86
New For The Road	87
New For The Home	95
New For The Sportsman	99
HHF: Major General Francis H. Griswold	100

SHORT FEATURES

Push-Up Plane	65
MI-Stoppers	69
Gourd Head-Hunter	77
Monsters At Work	81
1894 Dreamboat	94
First Armored Car	94

DEPARTMENTS

Editor's Workbench	14
Invention Clinic	18
Dear Editor	30

(continued on page 10)



W. H. FAWCETT, JR. president
ROGER FAWCETT general manager
RALPH DAIGH editorial director
AL ALLARD art director
LEE WILSON production director
JACK BRYNER advertising manager

WILLIAM L. PARKER editor

feature staff

GILBERT PAUST feature editor
ARTHUR UNGER news editor

crafts & hobbies staff

ROBERT BRIGHTMAN crafts & hobbies editor
JOHN G. KINGDON boating editor
JOHN L. SCHERER associate editor
LARRY EISINGER advisory editor

art staff

FRANK A. TAGGART art editor
AL HEIGHINGTON art associate
HENRY E. BIRD art associate

HELEN E. SLOWIN production editor

VOLUME 48 NUMBER 5

A FAWCETT PUBLICATION

COPYRIGHT 1953 BY FAWCETT PUBLICATIONS, INC.

TITLE REGISTERED U. S. PATENT OFFICE

COVER: DAVID LOCKHART

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., Fawcett Building, Fawcett Place, Greenwich, Conn. Printed in U.S.A. Editorial offices: 67 W. 44th St., New York 36, N. Y. Advertising offices: New York 36, 67 W. 44th St.; Detroit 26, 1659 Guardian Building; Chicago 11, 612 N. Michigan Ave.; Los Angeles 17, 643 S. Flower St.; San Francisco 5, 605 Market St. General Offices, Fawcett Building, Fawcett Place, Greenwich, Conn. Roscoe K. Fawcett, Circulation Director; Gordon Fawcett, Treasurer; Allan M. Adams, Secretary; Al Allard, Art Director. Entered as second-class matter at the post office at Greenwich, Conn., under the act of March 3, 1879. Additional entry at Louisville, Ky. Copyright 1953 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to MECHANIX ILLUSTRATED, 67 West 44th St., New York 36, N. Y. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to Circulation Department, Fawcett Building, Fawcett Place, Greenwich, Conn. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 20c a copy, in the United States and Possessions and Canada. Subscriptions \$2.40 per year in the U. S., Possessions, Canada and Pan-American countries. Other foreign countries \$3.15 per year. Foreign subscriptions and sales should be remitted by International money order in U. S. Funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

COVER STORY



CAT COMES BACK

Spaciousness, speed and stability are features of latest catamaran designs.

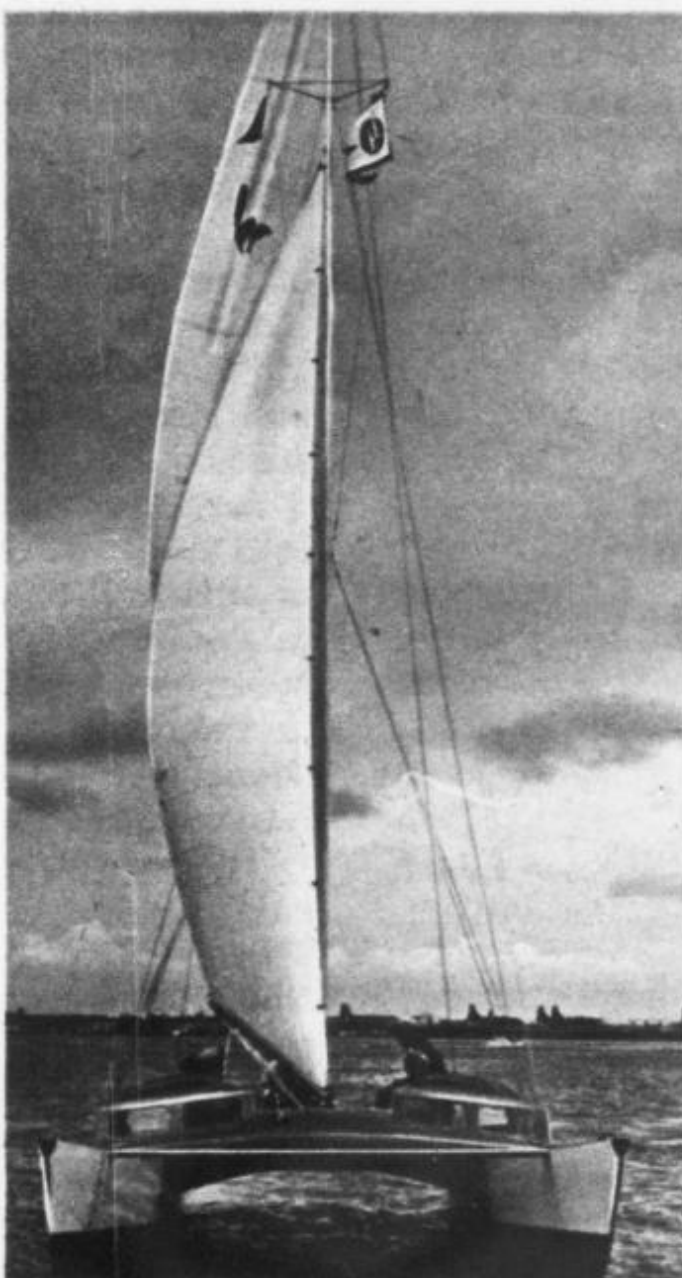
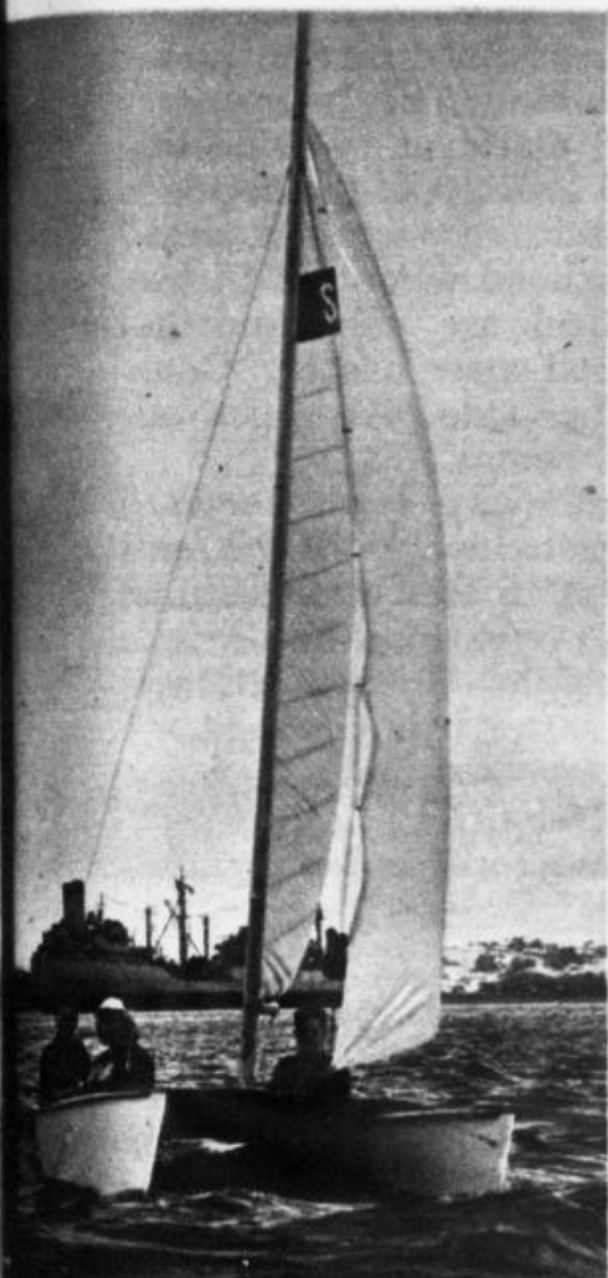
**By David Lockhart
and John G. Kingdon**

HOW would you like a dream boat of an express cruiser that will skitter through shoal water like a Florida swamp buggy and take to blue water like a Gloucesterman? Gemini is just such a boat. Because of her catamaran design, she combines puddle-jumping and seagoing propensities as no conventional hull ever could, making her ideal for fast Intercoastal Waterway transportation to Florida and for deep-sea fishing after she gets there.

Sea Cat 16, manufactured by Custom Hydrocraft, has room for four in its twin hulls.

Four people can cruise in solid comfort aboard Custom Hydrocraft's 34-ft. auxiliary.

Available in both kit and completed forms, Lear-Cat's 16-footer is roomy and dry.



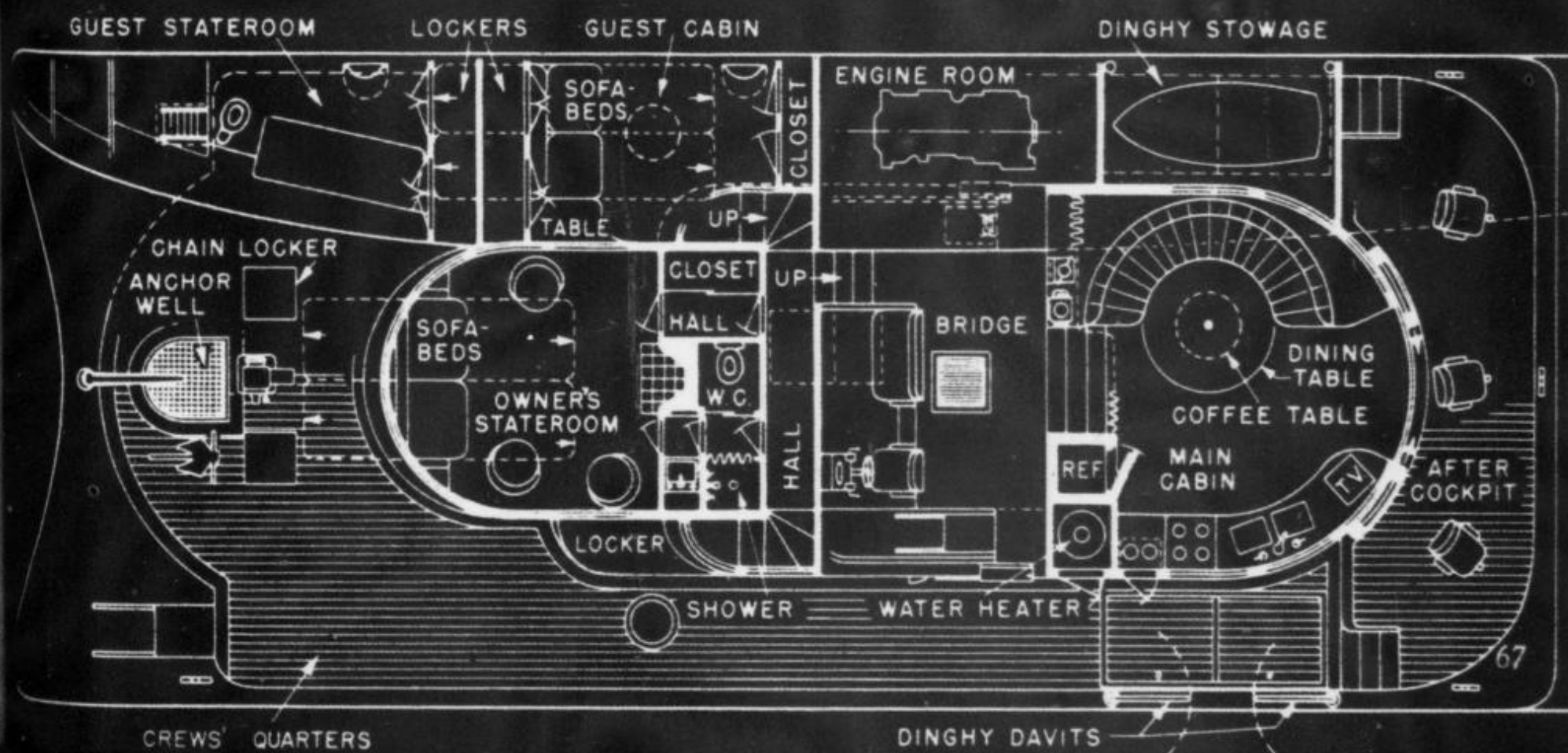
She is 65 ft. long, has a 25-ft. beam and draws 3 ft. at rest and about half as much when under way. Twin 300-hp diesels give her a cruising speed of 25 mph. She will accommodate seven people in the owner's party and a crew of two in comfort even on extended cruises.

Her hull design follows the accepted intriguing practice of taking a conventional hull, splitting it down the middle and using the port half for the starboard pontoon and

vice versa—not forgetting, of course, to plank up the open wounds before the launching. The outer sides of the two hulls are thus flat and straight and the bow waves are thrown into the tunnel between the hulls.

The deck layout includes a stern cockpit 23½ ft. wide by 7½ ft. long. There's plenty of space here for either three fishing chairs or a host of deck chairs. Just forward of the cockpit, two dinghies stow out of the

MI-designed Gemini has accommodations for seven passengers and a crew of two.



way under hatches. Access to the bridge from the port and starboard decks is through sliding doors. The broad foredeck features a well through which the anchors are handled with ease and safety. The electric anchor winch is flanked by two chain-locker hatches and, further outboard, by two forecastle hatches. The rounded bow cowling encloses ample locker space for deck chairs and other bulky gear. A large headlight set into the bow facilitates locating a mooring at night. Atop the after deckhouse is a streamlined mast. It holds a TV antenna and its broad spreaders form fish-spotter lookout seats. Just above the base of the mast is a pedestal to accommodate a radar scanner.

Opening into the after cockpit through wide sliding double doors is a semicircular main cabin. A counter along the port side of the cabin houses a gas range, a double-basin sink and a television set. At the forward end of the counter is a compartment containing a water heater and inboard of this compartment there's a large refrigerator. On the starboard side is a semicircular lounge. In front of the lounge is a round coffee table on a floor-to-ceiling pipe. A larger table on the same pipe rests on the coffee table for dining and slides up to stow against the ceiling between meals. When under way at night, a light-tight accordion door between the main cabin and the bridge is shut so the bridge can be kept dark.

An aircraft-type Plexiglas canopy covers the bridge. The forward section of the canopy can be pushed back in good weather. For shade when the sun is strong, there's a roller screen on the underside of the canopy. A counter to starboard

along the after end of the pilot house holds radar equipment, a radio direction finder and a radio telephone. The helmsman's seat is on a raised platform. Beside this seat is a settee and in front of the settee is a chart table that slides into a recess ahead of the forward bulkhead when not in use. Under the bridge deck are water and fuel tanks and an oil-fired space heater. Companionways on either side give quick access to the engine rooms.

Another companionway leads forward into an athwartships hallway. At the ends of this hall are steps to two guest cabins; in the middle, doors open into the owner's stateroom and the bath. The water closet and shower in the latter compartment are separately enclosed so that more than one person can use the facilities at a time.

The owner's stateroom and the guest cabins have worlds of closet and drawer space. Each compartment has twin beds that slide partially into a recess ahead of the forward bulkhead and thus form a sofa by day. And each compartment has its own wash basin. The big windows and fireplace in the owner's stateroom make it a cozy observation cabin in bad weather.

Gemini's name, for the incidental intelligence of those who may not have had their stars charted recently, is borrowed from the astrological twins and denotes her double-hull design. The word *catamaran* is derived from two words in the Tamil language: *kattu* (tie) and *maram* (tree). The catamaran was thus originally a raft or float consisting of two or more logs lashed together. It was moved by paddles or sails.

This primitive raft was eventually developed to the [Continued on page 168]

Remarkable stability of the Kattu 21-ft. outboard runabout is evident here. With all eight passengers over on one side, the boat stays virtually level.



PUSH-UP PLANE



1. Air intake louvers
2. Multi-stage air compressor
3. Compressor drive shaft
4. Drive shaft gear-box
5. Gas turbine power plants
6. Compressed air duct to nozzle
7. Diversion slots for vertical ascent

YOU may see this little plane streaking through the air some day—if Lockheed Aircraft takes seriously the patent recently assigned to it by inventor Nathan Price of St. Helena, Calif. Gas turbines drive air compressors in the wing tips which direct air either downward to lift the plane, or back through the tail to provide thrust. The pilot steers it by moving the plane's tail which is connected to the cabin by a universal joint. Original design is two-place with a span of 12 feet and a gross weight of 1,600 pounds. Cruising speed should be about 300 mph. In case of power failure, it can glide to a safe landing. The retractable landing gear has resilient cushions instead of wheels. These and hydraulic shock absorbers will enable it to touch down as softly as a helicopter. •

DAY...
REFERENCE
2nd FLOOR MAY 4 '54

MECHANIX ILLUSTRATED[®]

THE HOW-TO-DO MAGAZINE

NEW

20¢
APRIL

Amazing New Flying Jeep
Uses Jet Power—Page 84



See Page 120

WORLD'S WACKIEST HOBBIES

**HOW TO TAKE PICTURES
IN TOTAL DARKNESS**



BUILD A COFFEE-TABLE RAILROAD

MECHANIX ILLUSTRATED

SPECIAL FEATURES

Let's Make The Antarctic	
Our Icebox	Rear Admiral Richard E. Byrd 55
Ted Mack's Memento Museum	Frank Lynn 62
You'll Live Longer Than You Think	Lester David 64
World's Wackiest Hobbies	Irv Leiberman 70
Don't Get Seasick	Milton Liebman 76
Bus Runs Without An Engine	W. P. Jaspert 82
Give-It-The-Works Wizard	H. W. Kellick 102
Chip-Chop Fishermen	Raymond R. Camp 106

TOM McCAHILL

McCahill Tests The Brand-New Baby Nash	92
MI Tests The MG-TF	96

REGULAR FEATURES

MI-Stoppers	61
New In Science	68
He Found A Way: Peter MacGregor's	
Fire Extinguisher	Alfred Lief 75
Picture-Naries	79
Money Making Idea:	
He'll Tan Your Hide	John W. Aberle 86
Prize Gadget: Automatic Mouse Trap	89
Pin-Up Car	90
New For The Home	91
MI Tests For Sportsmen	Gil Paust 110

SHORT FEATURES

Mobile Printing Plant	60
Portraits In Postage	74
Birdie—The Weed-Eating Bug	78
Car With 4-Wheel Engines	80
Kurtis Kraft for Kids	81
Cover: Army's Flying Jeep	84
Tools of Yesterday	100
Grotesqueries	101
Ryan's Flying Raspberry	109
Florida's Violin Mechanic	112
History In Coal Balls	113
Insect Sculptor	114

DEPARTMENTS

Editor's Workbench	14
Invention Clinic	20
Dear Editor	24

(Continued on page 6)

COVER BY PETER GOWLAND

MI

APRIL 1954

W. H. FAWCETT, JR. president
ROGER FAWCETT general manager
ROSCOE K. FAWCETT circulation director
GORDON FAWCETT secretary-treasurer
RALPH DAIGH editorial director
LEE WILSON production director
AL ALLARD art director

WILLIAM L. PARKER editor

feature staff

GIL PAUST feature & outdoors editor
J. ROBERT CONNOR picture editor
HARVEY B. JANES science editor

crafts & hobbies staff

ROBERT BRIGHTMAN crafts & hobbies editor
JOHN L. SCHERER associate editor
RAY GILL associate editor

art staff

AL HEIGHINGTON art editor
FRED COSPITO art associate
ROBERT WALK art associate

HELEN E. SLOWIN production editor
LARRY EISINGER advisory editor

VOLUME 50 NUMBER 4

A FAWCETT PUBLICATION

COPYRIGHT 1954 BY FAWCETT PUBLICATIONS, INC.

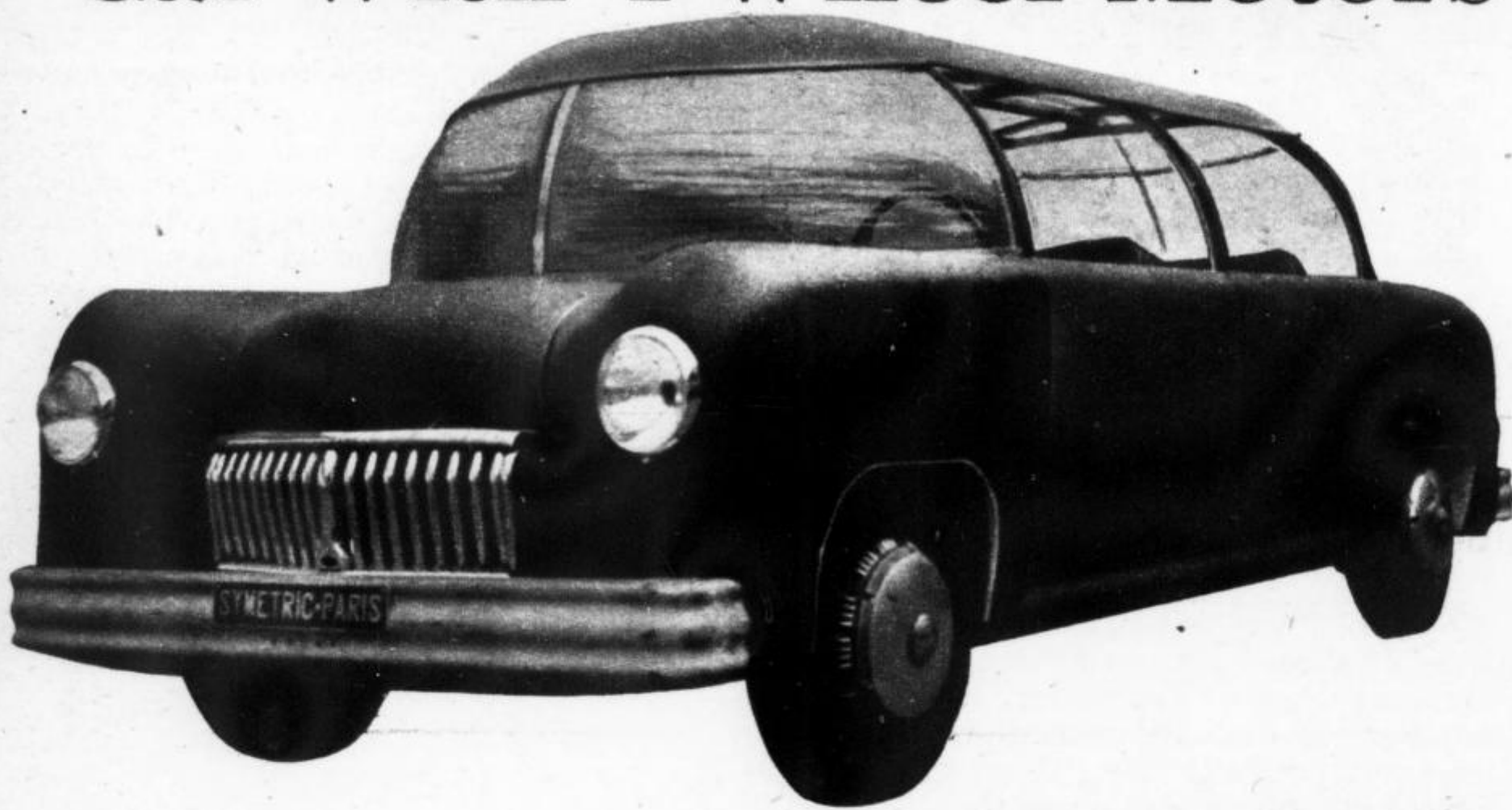
TITLE REGISTERED U. S. PATENT OFFICE

Permission hereby granted to quote from this issue of this magazine on radio or television, provided a total of not more than 1,000 words is quoted and credit is given to the title of the magazine and issue, as well as the statement, copyright 1954, by Fawcett Publications, Inc.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., Fawcett Building, Fawcett Place, Greenwich, Conn. Editorial offices: 67 W. 44th St., New York 36, N. Y. Advertising manager: Garrett Livingston. Advertising offices: 67 W. 44th St., New York 36, N. Y.; 612 N. Michigan Ave., Chicago 11, Ill.; 643 S. Flower St., Los Angeles 17, Cal.; 605 Market St., San Francisco 5, Cal.; 1659 Guardian Bldg., Detroit 26, Mich. Entered as second class matter at the post office at Greenwich, Conn., under the act of March 3, 1879, with additional entry at Louisville, Ky. Printed in U. S. A. Title registered in the U. S. Patent Office. Copyright 1954 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Address manuscripts to New York editorial office. Unacceptable contributions will be returned if accompanied by sufficient first class postage. Not responsible for lost manuscripts or photos. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to MECHANIX ILLUSTRATED Circulation Dept., Fawcett Place, Greenwich, Conn. Price 20¢ a copy. Subscription price \$2.40 per year in the U. S. and possessions and Canada. All other countries \$5.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in U. S. funds payable at Greenwich, Conn.

MEMBER AUDIT BUREAU OF CIRCULATIONS

Car With 4 Wheel-Motors

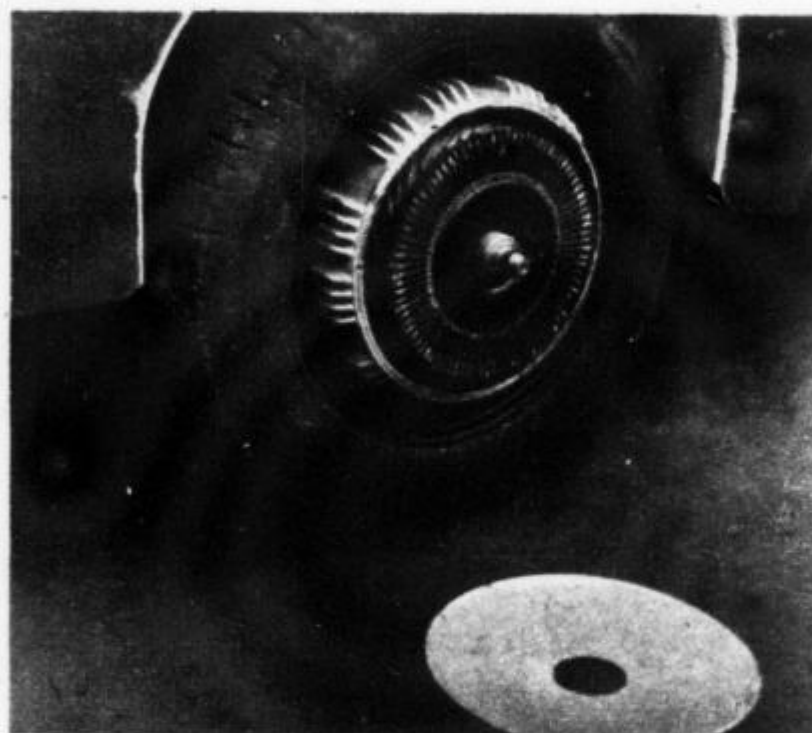


Unconventional new Symetric looks like a "car of the future," has low-slung body, huge windows.

ONE of the most revolutionary cars to appear since the invention of the round wheel is the new French Symetric which is powered by a small 45-hp gasoline engine that in turn drives a generator and four electric motors, one in each wheel. With controls so simple a beginner can learn to drive it in one lesson, the car combines 32-miles-per-gallon gas mileage with a top speed of better than 90 mph.

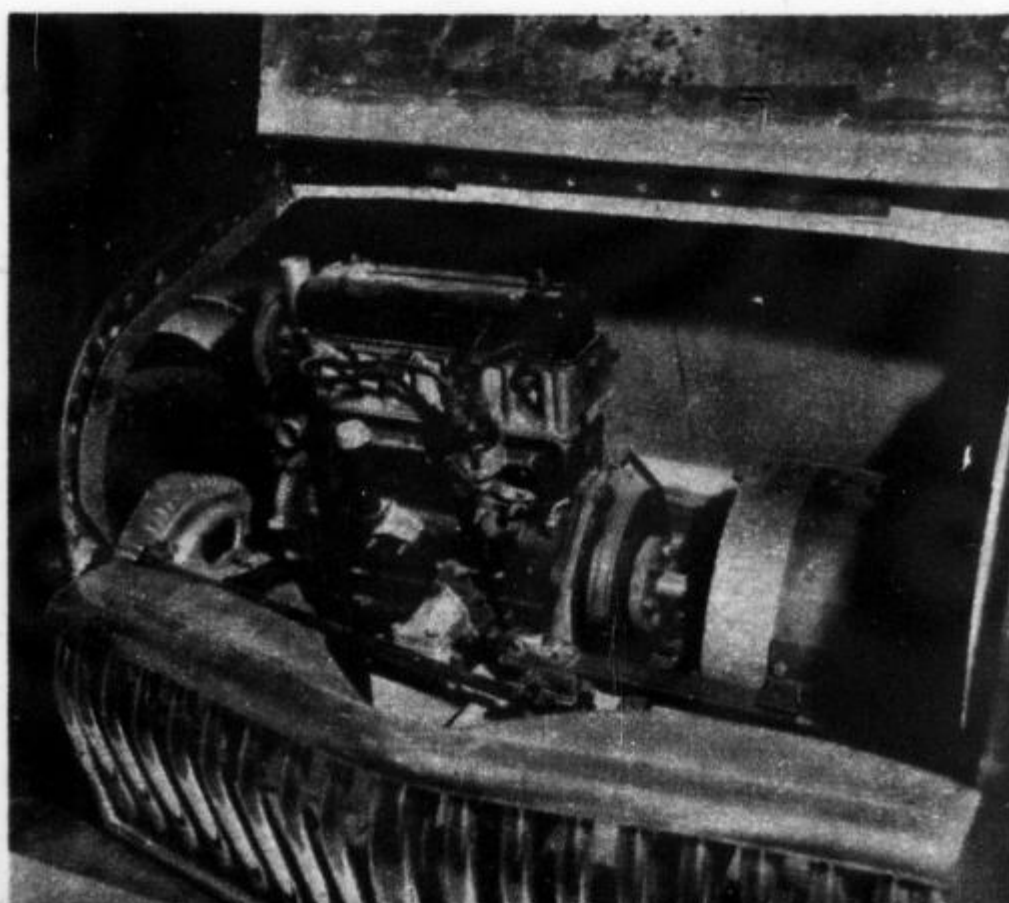
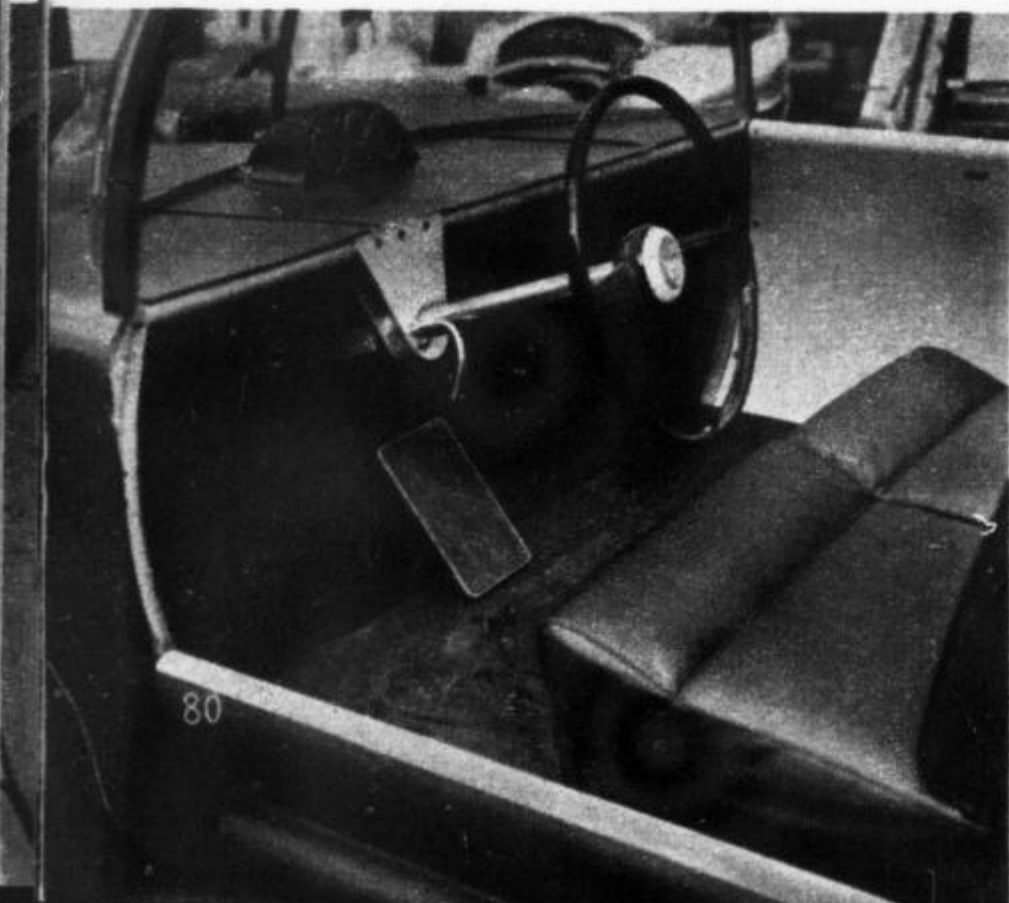
The Symetric is built by the Compagnie Normande d'Etudes, in Paris, and features a plastic body with huge windows that roll into the top and bottom. The single-tube chassis also acts as a gas tank. Estimated cost of the Symetric is about \$1,000. •

Driver's compartment is simplicity itself. Steering wheel and gas pedal are the only controls necessary. Note convenient shelf space on dash panel.



Simple hubcap comes off to reveal one of the four electric wheel-motors which act both to drive car and to brake it when accelerator pedal is released.

Small gasoline engine, left, and the generator are placed in line with the front axle, thus giving extra passenger space. The car seats six comfortably.



Let's Make The Antarctic Our Icebox

MI
SPECIAL FEATURES

By Rear-Admiral Richard E. Byrd
as told to
Harold Rosenthal



It was so cold in Byrd's Little America camp in 1940—down to 85 deg. below zero—that he and his men were obliged to melt ice constantly for water.

America's famed Antarctic explorer has a food-storage plan to abolish famine, war.

THE vast Antarctic, millions upon millions of square miles of waste locked in the grip of an Ice Age, could become one of the most important areas on the face of the earth. That vastness, alternately brooding and gale-swept, could help solve the ancient riddle of plenty versus want and thereby contribute to man's eternal struggle to banish war and scarcity. In fact its importance in the future may possibly dwarf some of

Admiral Byrd seen during his last expedition.





our most advanced scientific development of today. If it does all this it will be because nature unknowingly contrived that area surrounding the South Pole as the greatest "deep-freeze" of all time.

However, I should like to say here, even though it may appear that Antarctica is a "no-man's land," that to those who have lived there and understand that strange area it almost seems as if nature had developed it and put it aside to be of use for mankind. (For instance, we know that Antarctica is an unused reservoir of natural resources to be used by man when he will have expended his heritage in minerals that lay under the earth.

Nearly six million square miles of snow

and ice, an area where no unprotected human being could survive for more than a few hours, could serve as a combination bank-larder for the world's surplus food supply according to a plan I have envisioned as feasible. It is an idea in which I am much interested because of my work with the International Rescue Committee, which has undertaken the task of feeding and helping refugees from behind the Iron Curtain. I have seen what happens when there is a lack of enough food to sustain life. Perhaps it won't be tomorrow, or even the day after that, but the day must certainly come when we can put to use the vast food storage resources of the Antarctic.

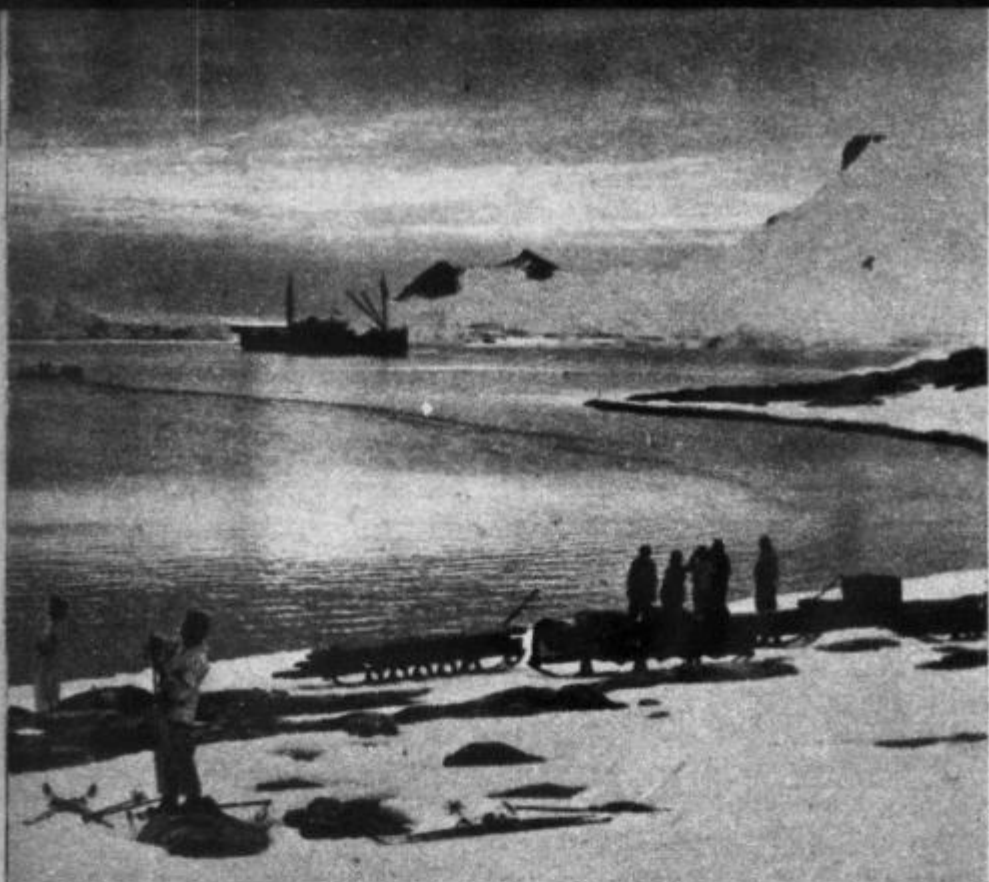


MI ARTIST FRANK TINSLEY has given us, in the above two-page illustration, his conception of what the typical Antarctic storage base might look like. Frozen food is unloaded from refrigerator ships at left onto huge helicopters which, in turn, fly it directly to the underground warehouses ashore.

These installations consist of a number of deep-freeze storage chambers, built on multiple levels around a central service shaft. The top of the entrance shaft is fitted with frozen-in coamings over which a weather-proof hatch cover is fitted. This cover is equipped with four wind-driven ventilators. Two of these draw in the cold surface air and circulate it through the lower levels via ducts built into

the central columns and floors. The other two ventilators are for exhaust purposes. Anchored into the center of the hatch cover is an igloo-like structure that serves as a vestibule and engine control room for the warehouse below. And atop the storage unit is a tall staff bearing a numbered identification flag.

A simple, cheap method of constructing these deep-freeze units would be to build them from the surface in deep, blasted out pits, as seen on the right, using tried and true techniques of concrete-frame building erection. The only difference would be that melted snow-water would replace the concrete mix. Once poured in place, it would freeze solid almost immediately.



Ships loaded with foodstuffs could be anchored in small inlets like this one in the Antarctic Bay of Whales, just clear of dangerous icebergs.



These Army tanks, using extra wide treads, were employed by the Byrd expedition for transportation of supplies. Now we could use helicopters.

The problem is not too difficult. In some years and in some countries too much food is produced—in other countries not enough. If you produce too much, you can either store it or destroy it. Meanwhile, in some other country people may be literally starving for the same kind of food. And history has often proved that hungry people are people who fall prey to selfish and dangerous forces, such as tyranny.

The Antarctic and its deep-freeze facilities would provide the perfect means for balancing over-production in one year and shortages the next. It is the idea of the squirrel hoarding nuts multiplied a million fold. Here it wouldn't be a solitary squirrel stashing away hickory nuts, but various nations of the world joining in a common effort to make starvation just a thing of the past.

I can envision the top technical men in the world being called upon to implement this plan—of ice-breaking refrigerator ships powered perhaps by atomic engines, large and adequate motor sleds, of helicopters with the capacity of freight cars. I picture literally billions of loaves of quick-frozen bread snuggled down into the low temperatures of the *neve*, the old combination of snow and ice which covers most of the Antarctic, waiting for an emergency call from some famine-stricken sector of the globe.

And I visualize further, a smooth-functioning international organization of men of many languages and interests working together toward the common purpose of hustling the food out of nature's biggest refrigerator, where it could conceivably be

kept in a perfect state of preservation for years on end.

The basic food I think, should be bread, because it is the traditional "staff of life." Moreover, food scientists of today declare that that ancient axiom could eventually become literally true.

It happens that at the present time I am in charge of the quick-frozen foods division of Arnold Bakers, Inc., one of the largest bakeries in the Eastern United States. Last summer, from their ovens and quick-freeze lockers in Port Chester, N. Y., they sent the first load of quick-frozen bread out of the United States, destined for hungry Western Germany. The experiment was a substantial success.

We are continuously striving to make bread the all-around food, and by putting additive proteins and vitamins into it, it is truly the "staff of life." The time could come when bread would furnish the necessary nourishment to keep a person alive indefinitely.

To bring that day closer, the "all-time-stops" aspects of the Antarctic should be brought into use. That section of the world, so cold that it averages many degrees lower in temperature than comparable areas in the arctic, has the power to put all living things into a state of suspended animation.

For how long? I don't really know, but I recall bringing some green ice chopped from a frozen Antarctic lake back to the Little America base on one of my expeditions. When the ice was thawed out the expedition's biologists advised me that there were live micro-organisms wiggling



Here is the inside of one of the Arnold Bakers' quick-freeze storage rooms in Port Chester, New York. Much of the frozen bread goes to Europe.



United Nations flags are dropped over the South Pole in 1947. The free peoples of the world may use this land some day as a cold-storage vault.

in the water. I think that they could have been several thousand years old, or perhaps more.

The Antarctic food-on-the-table story is known to millions of newspaper readers who followed the progress of my various polar expeditions. Food left on a table in Little America by a preceding expedition was found to be edible four years later.

Those strong gales of the Antarctic cause drifting in excess of the Arctic regions, but I believe that could be a help instead of a hindrance in the storage of frozen foods. Although the drifting snow would bury it, this is a proven advantage since the food supplies could be stored on or near the surface. The nature of the Antarctic storms and weather would finish the job of natural refrigeration. Markers similar to those we used to spot the first of our four Little Americas could be used to help those looking for the stored food later.

Actual storage of the food would be a simple procedure. Refrigerator ships, especially equipped for handling frozen foods, would move across the Ross Sea after moving past the tip of South America or the Antipodes.

The ships would anchor in the Bay of Whales along side the Ice Barrier. Up suitable inclines (these would vary as the front of the Barrier broke off in the form of icebergs), strong tractors and caterpillars would haul the surplus foodstuff ashore.

Once atop the Barrier, the vast stretches of the Ross Ice Shelf would extend before the sleds. The heavily-laden sleds would fan out, to predetermined places of loca-

tion, as indicated on a master map which would take into account the necessity for having these locations for the storage of the food on areas of ice which were firmly held by land underneath the great Ice Barrier.

The bread would be put on the Barrier and covered with sufficient surface snow to prevent unusual changes in temperature at the onset, and to "bed down" the food stuffs awaiting nature's own protective coating which would retain stabilized temperatures indefinitely, wholly adequate for long term preservation of the stored food. A marker would be erected, a radio message would advise a headquarters that the food was in storage, and somewhere in a vast ledger would be entered a credit of the number of loaves available for future use by hungry populations.

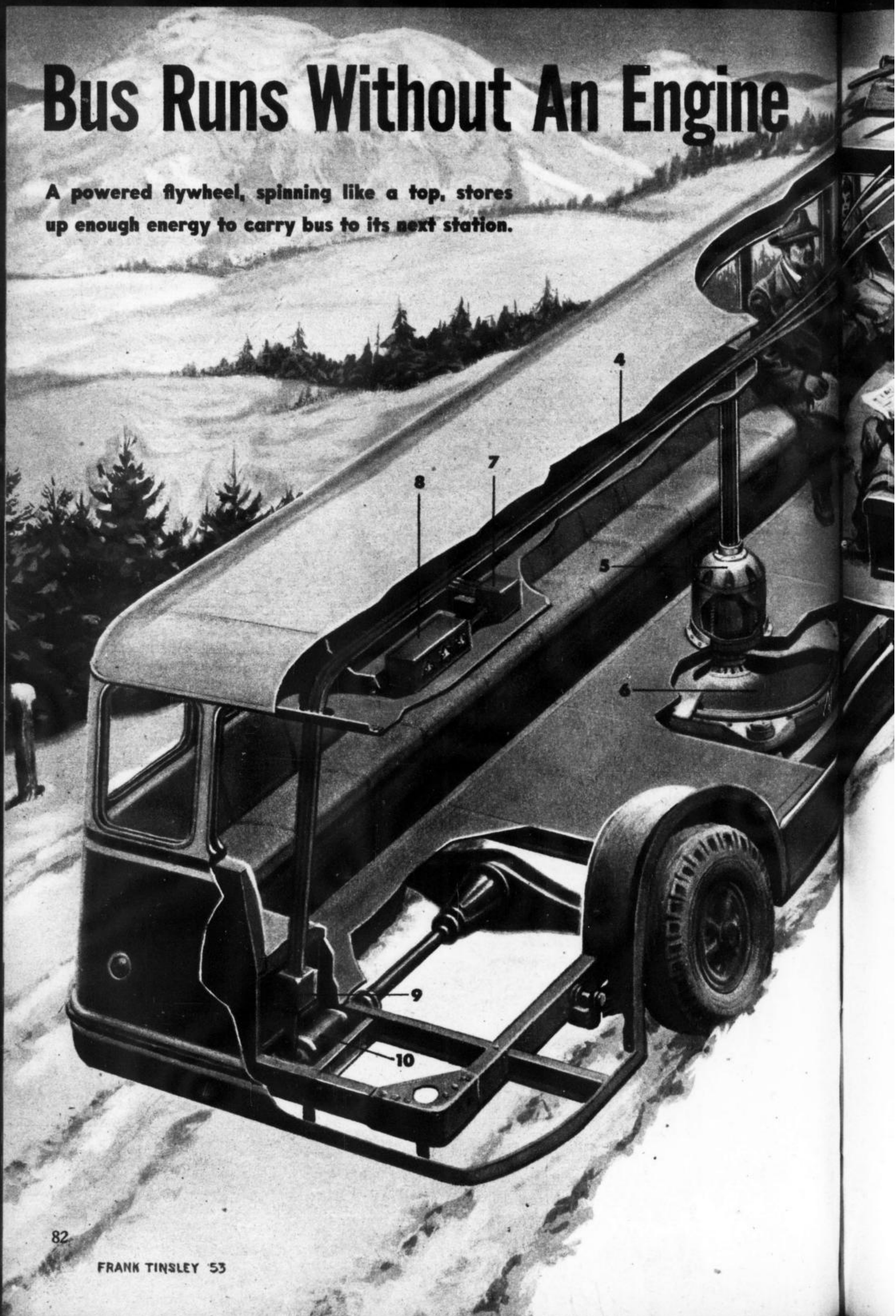
Withdrawals of reserve food would be accomplished by the same procedure, only in reverse. Technicians and equipment would be flown down ahead of the ships and the bread would be waiting to be loaded when the ships arrived.

An expensive proposition? Certainly. Would new machines have to be devised so that men could work and survive in very cold temperatures? Absolutely.

But one of man's oldest enemies, the cold that kills, would be put to modern use favorable to man's needs. Planning, technical skill needed? Yes! However, the result would be two-fold—that of beating not just cold, but also hunger. This technical genius in using wholly adequate elements would measure a new milestone of triumph against hunger and want. •

Bus Runs Without An Engine

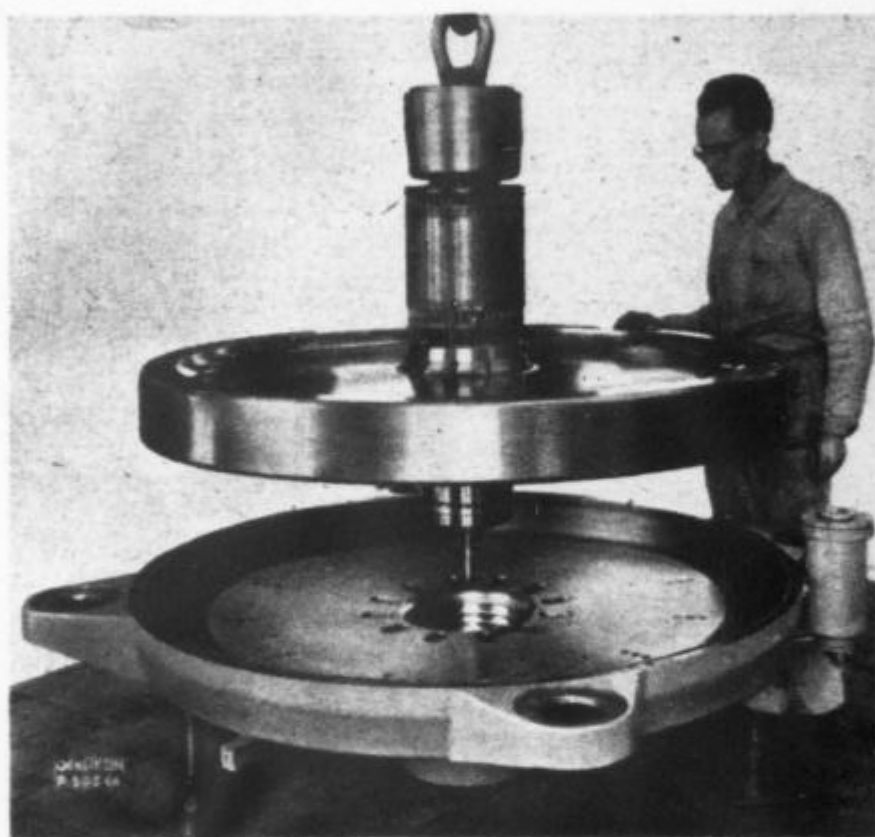
A powered flywheel, spinning like a top, stores up enough energy to carry bus to its next station.





At each stop, driver raises bus' contact horns to current terminals to recharge the flywheel.

Huge "power plant" which revolves at 3,000 rpm and stores the kinetic energy used for propulsion.



1—Battery connected contact operates power pole switches. 2—Battery and wiring. 3—Contact horns (shown retracted) rise to draw current from power pole conductors. 4—Power lines. 5—Three-phase squirrel cage motor which revs up flywheel. 6—Gyroscopic flywheel. 7—Gear regulator. 8—Condensers. 9—Speed regulator. 10—Electric motor energized by flywheel drives wheels.

PASSENGERS riding the new, engineless Gyrobus in Switzerland are delighted with the vibration-free, quiet-running, odorless performance of the vehicle. Developed by the Oerlikon Engineering Works, it looks like any ordinary bus but its construction is quite different.

The actual power plant of the Gyrobus is a huge, 350-pound horizontal flywheel that supplies electrical energy to a motor that drives the wheels. It runs in a hydrogen-filled chamber which is spring suspended from the chassis.

The flywheel derives its energy from a three-phase squirrel-cage electric motor connected to it and to three contact horns on the roof of the bus. These horns are raised at each bus stop to pick up current for the motor which revs the flywheel to

approximately 3,000 rpm, resulting in an accumulation of kinetic energy. When the motor is switched off, it becomes a generator and transforms the stored energy in the flywheel back into electricity which drives another motor which powers the wheels. Recharging the flywheel takes 30 seconds to three minutes, depending on the distance to be traveled.

The bus' maximum range is about five miles and it steers as easily as the ordinary variety. Speed changes are made by changing poles on the motor and generator. When the power is shut off, the load on the motor acts as a brake for the wheels and also returns some energy to the flywheel. Special power stations and cables are unnecessary since the bus recharges on ordinary three-phase current.—W. P. Jaspert •

ARMY'S FLYING JEEP



Prototype XH-26 helicopter is pictured during a test flight. At left is one of the small, powerful pulse-jet engines mounted on each rotor tip.



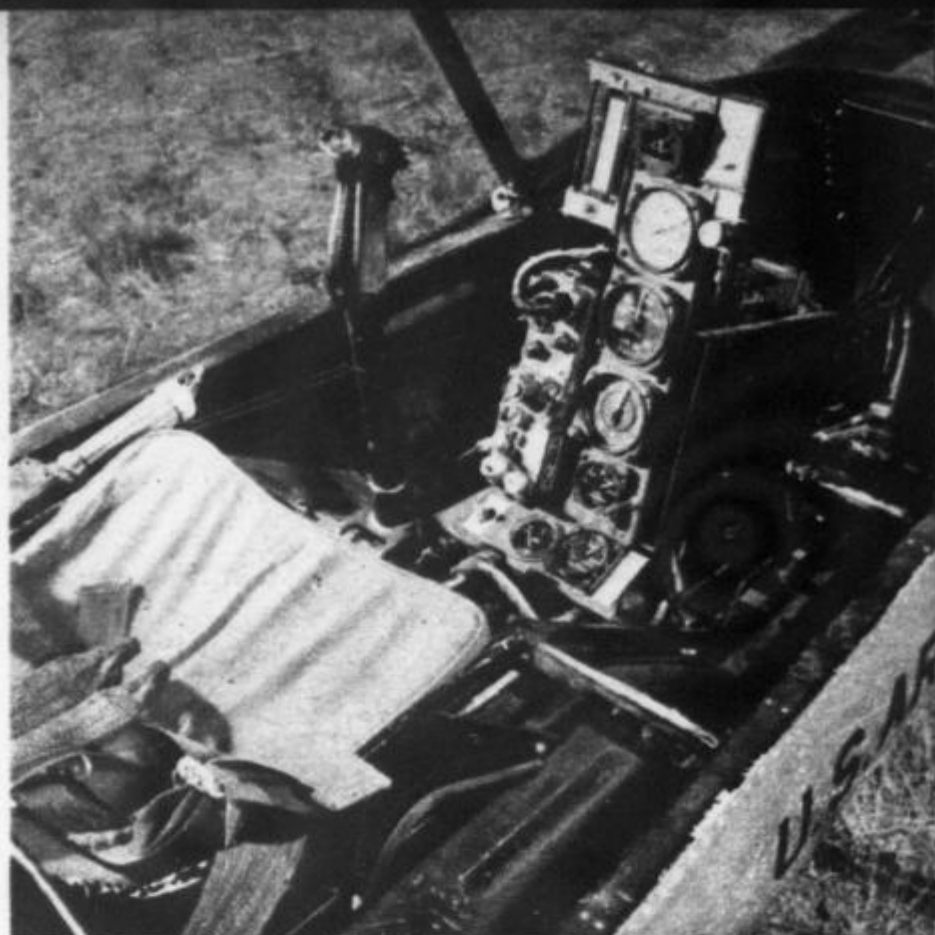
WHEN, in 1951, the U. S. Army and Air Force made it known that they wanted a one-man, lightweight, collapsible helicopter for liaison and reconnaissance, the American Helicopter Co. in California came to the rescue. They came up with a design for the first pulse-jet powered helicopter ever to be produced—the XH-26 Jet Jeep.

The name Jeep seemed to apply naturally to the fleet little military 'copter because it was small, cheap to produce, and

Mechanix Illustrated



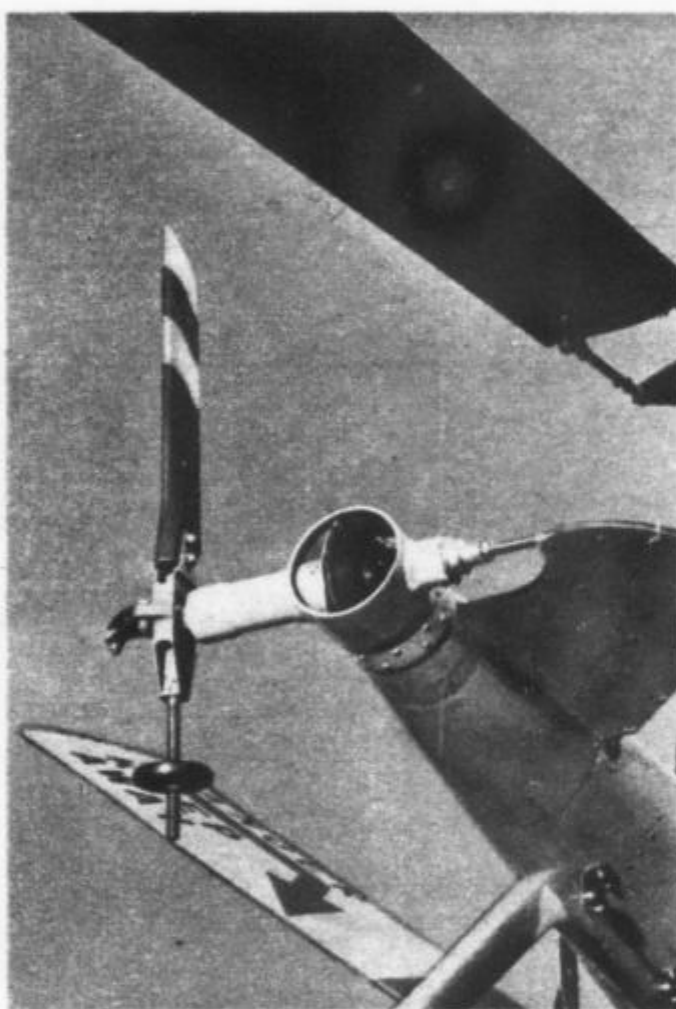
Pilot's compartment is fully enclosed. Bulging Plexiglas doors, full windshield and large rear window give fine visibility in all directions.



Flight controls consist of cyclic and collective rotor-pitch controls, rudder pedals for changing direction, plus a spring-loaded manual throttle.



Rotor hub extracts power from the rotor system to operate directional control rotor and accessories.



Rear-mounted directional control rotor is unconventional, having a single counterbalanced blade.



Rugged, maneuverable Flying Jeep is the first successful jet-powered helicopter for military use.

had the same rugged simplicity of its four-wheeled counterpart. Furthermore, it could burn ordinary jeep fuel and could collapse into a neat little package to be carried in a quarter-ton jeep trailer.

Power for the Jet Jeep is, as its name implies, supplied by two small pulse-jet engines, mounted at the rotor tips. These engines, which weigh a mere 18 lbs. each, are started within a few seconds from inside the pilot's compartment and the tiny 'copter can then be airborne in 30 seconds since no warmup period is required. The

engines have only one moving part, require no lubrication, and can be replaced in a few minutes.

Empty weight of the Flying Jeep is approximately 400 lbs. It has a top speed of 80 mph and can reach with ease altitudes comparable to conventionally-powered helicopters. Since all of the driving power is at the rotor tips and not at the rotor hub, a transmission is unnecessary and weight is greatly reduced, not to mention cost. The day of the jet helicopter is truly here. •

DAYTON PUBLIC LIBRARY MAR 19 58

REFERENCE

MECHANIX

ILLUSTRATED

THE HOW-TO-DO MAGAZINE



How to make your TV
set play anywhere!

Page 130

25^c

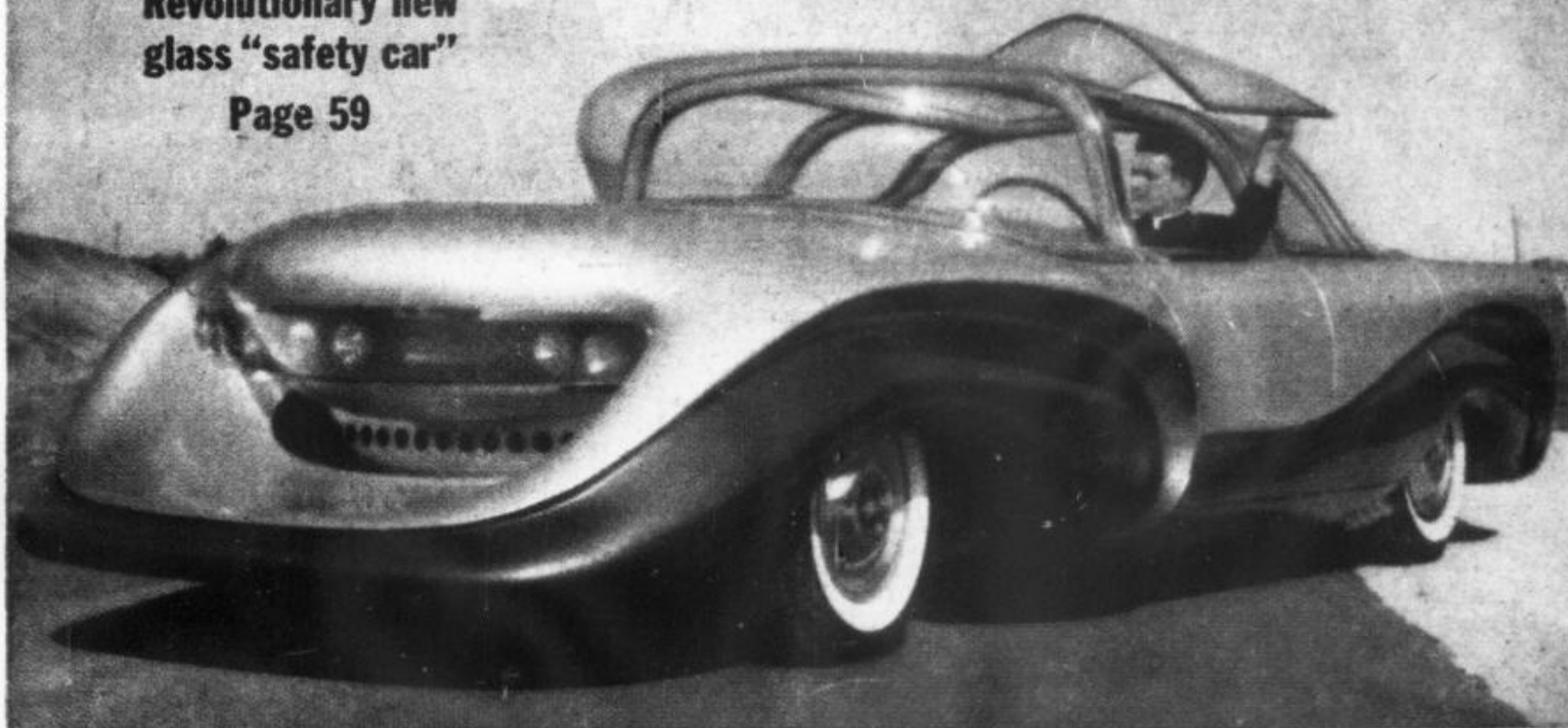
APRIL

SPECIAL BOATING SECTION!

Round-up of '58 power
craft that cost less
than a car—PLUS all
the facts about buying
and owning a boat

Revolutionary new
glass "safety car"

Page 59



Water Scooter
for summer fun
Page 104

**TOM McCAHILL'S FABULOUS CRUISER
EXCLUSIVE! HOW TO STOP SNORING
NOW THEY'RE BUILDING ROUND HOMES
YOU CAN BE A MODEL ROCKET PILOT**

MECHANIX ILLUSTRATED

A FAWCETT PUBLICATION

W. H. FAWCETT, JR. president

ROGER FAWCETT general manager

ROSCOE K. FAWCETT circulation director

GORDON FAWCETT secretary-treasurer

RALPH DAIGH editorial director

JAMES B. BOYNTON director of advertising

AL ALLARD art director

RALPH MATTISON associate art director

WILLIAM L. PARKER editor

ROBERT G. BEASON assistant editor

LAWRENCE SANDERS.....feature editor

ROBERT BRIGHTMAN home and shop editor

LEONARD ULINart editor

J. ROBERT CONNOR.....news editor

JOHN J. SMITH.....associate editor

WALTER MESAROSart associate

HARVEY GARDNER.....science editor

DICK HOWE.....associate editor

VINCENT TROIANOart assistant

HELEN E. SLOWIN....production director

ED BRANDONart assistant

JOHN WEBSTER eastern advertising manager



Page 59



Page 87



Page 104

SPECIAL FEATURES

Dream Car Come True	59
English Channel Tunnel At Last?	62
Mr. Colt's New Rifle	74
Home-Made Rockets Blast Off	87
How To Stop Snoring	90
Make Your Son's Bike Safe	98

TOM McCahill

Mail For McCahill	53
Tests The '58 Plymouth Suburban	78
Tests The '58 Cadillac	82

REGULAR FEATURES

Mimi	67
MMI: B-I-G Profits From B-I-G Shoes	68
It's New!	70
Eye Stoppers	86
Inventions Wanted!	95
Hunting & Fishing: Spinning For Big Trout	96
MI's Bright Idea Award: Electric Socks	100

SHORT FEATURES

Little Toot—The Winner!	66
Smallest TV Station	76
A New Angle—Round Homes!	92
Ford's 25,000,000th V8/Novel Water Ski Launcher	94

DEPARTMENTS

Science Shorties	14
Invention Clinic	18
Dear Editor	22
Patents Granted	31
It's Coming!	166
Speaking of Jobs: Tire Sculptress	167
Help Wanted	183

(CONTINUED ON PAGE 6)

APRIL 1958

VOLUME 54, NUMBER 4

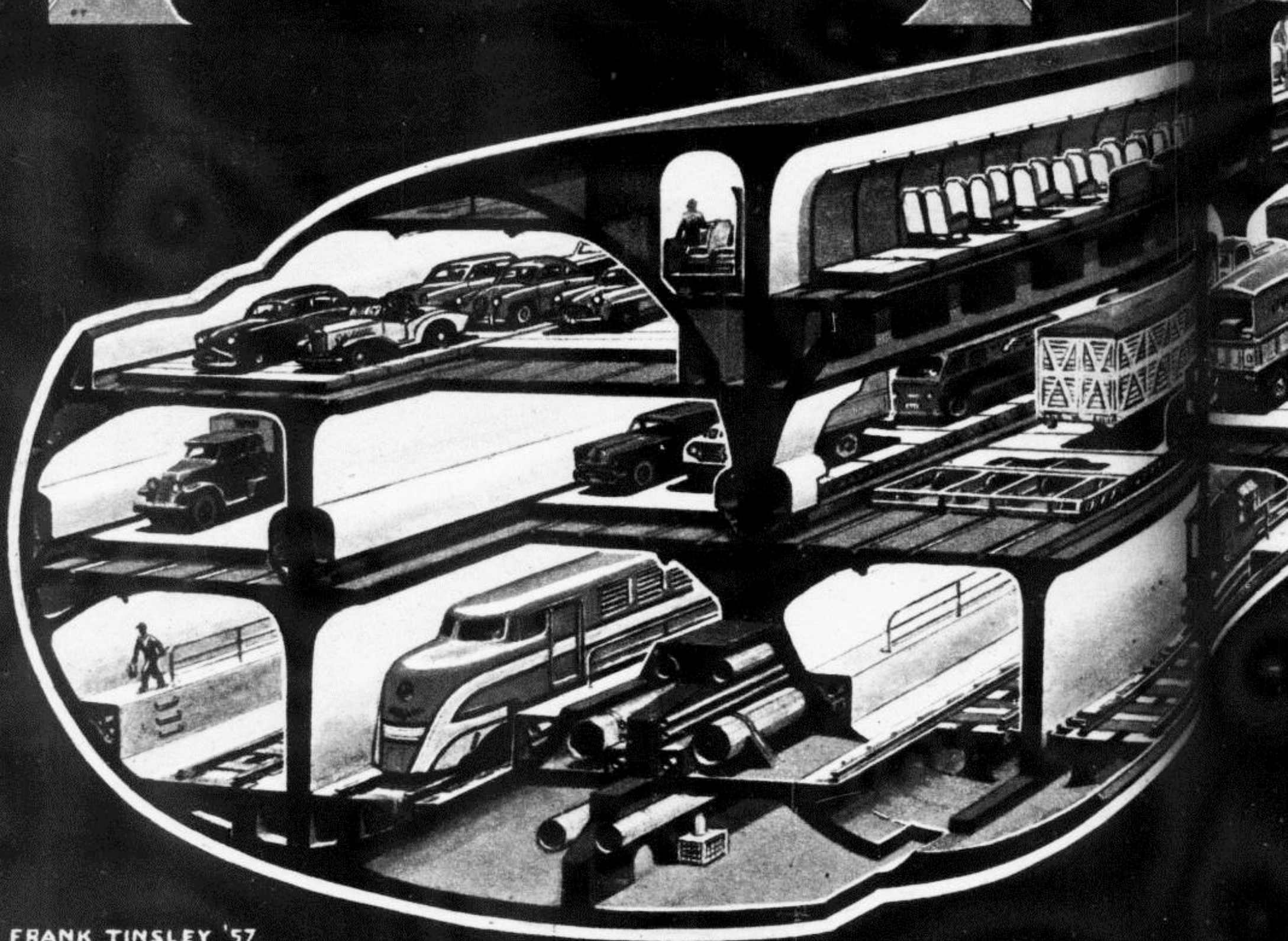
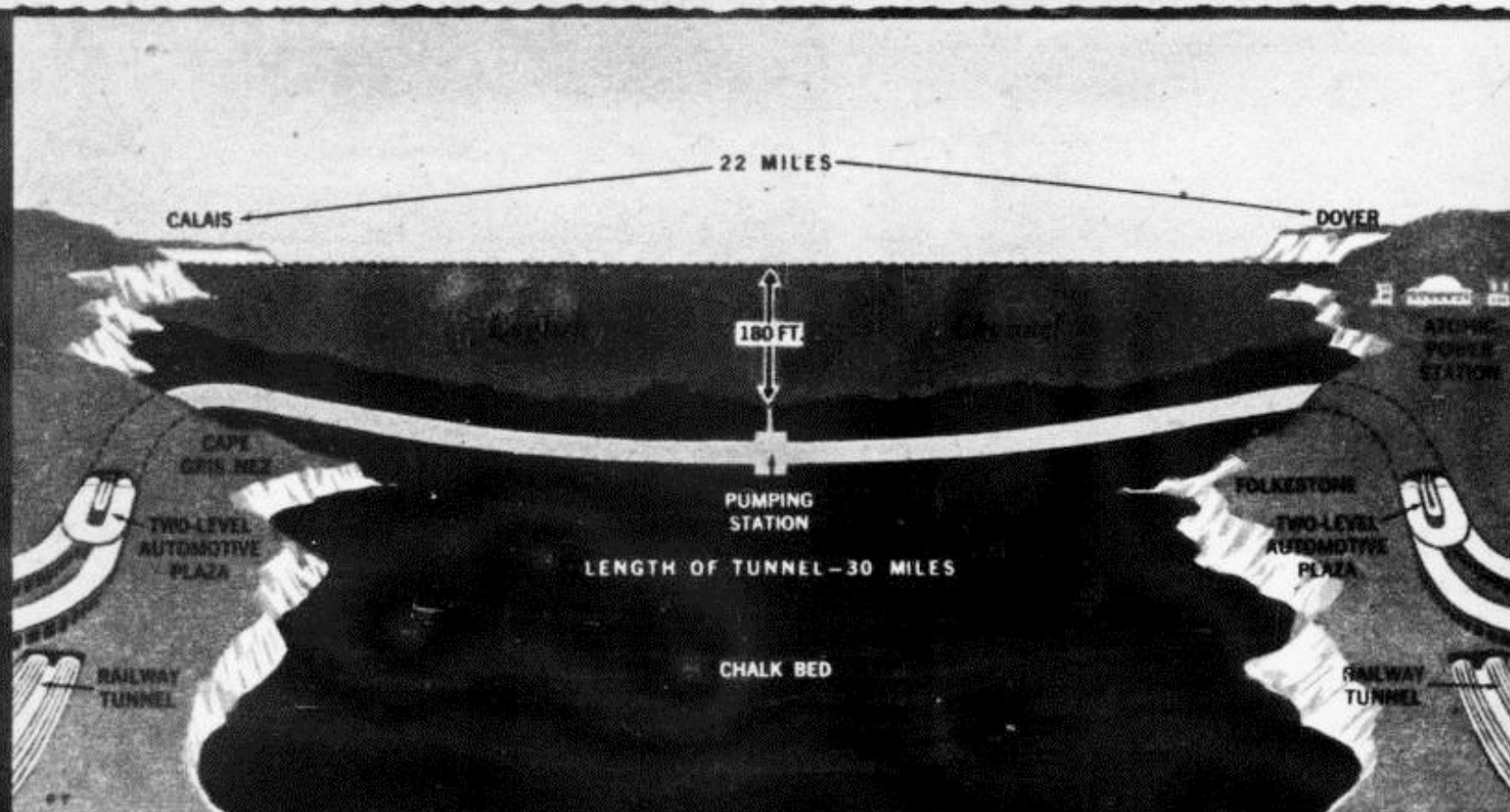
Cover photos by:
Portable TV set—
R. J. Capotosto
Safety Car—Curt Gunther
Water Scooter—
Douglas Grundy

Permission hereby granted to quote from this issue of this magazine on radio or television, provided a total of not more than 1,000 words is quoted and credit is given to the title of the magazine and issue, as well as the statement, copyright 1958, by Fawcett Publications, Inc. MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., Fawcett Building, Fawcett Place, Greenwich, Conn. Editorial offices: 67 W. 44th St., New York 36, N. Y. Advertising offices: 67 W. 44th St., New York 36, N. Y.; 612 N. Michigan Ave., Chicago 11, Ill.; Townsend, Millsap & Co., 159 S. Vermont Ave., Los Angeles 4, Cal. and 110 Sutter Street, San Francisco 4, Cal.; 1659 Guardian Bldg., Detroit 26, Mich.; Hale Printup Asso., Langford Bldg., Miami 32, Fla. Entered as second class matter at the post office at Greenwich, Conn., under the act of March 3, 1879, with additional entry at Louisville, Ky. Printed in U. S. A. Title registered in the U. S. Patent Office. Copyright 1958 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Address manuscripts to New York editorial office. Unacceptable contributions will be returned if accompanied by sufficient first class postage. Not responsible for lost manuscripts or photos. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to MECHANIX ILLUSTRATED Circulation Dept., Fawcett Place, Greenwich, Conn. Price 25c a copy. Subscription price \$3.00 per year in the U. S. and possessions and Canada. All other countries \$6.00 per year. Subscription price to members of the armed forces \$2.75 per year. Foreign subscriptions and sales should be remitted by International Money Order in U. S. funds payable at Greenwich, Conn.

MEMBER AUDIT BUREAU OF CIRCULATIONS
POSTMASTER: Send Form 3579 to Fawcett Building, Greenwich, Conn.

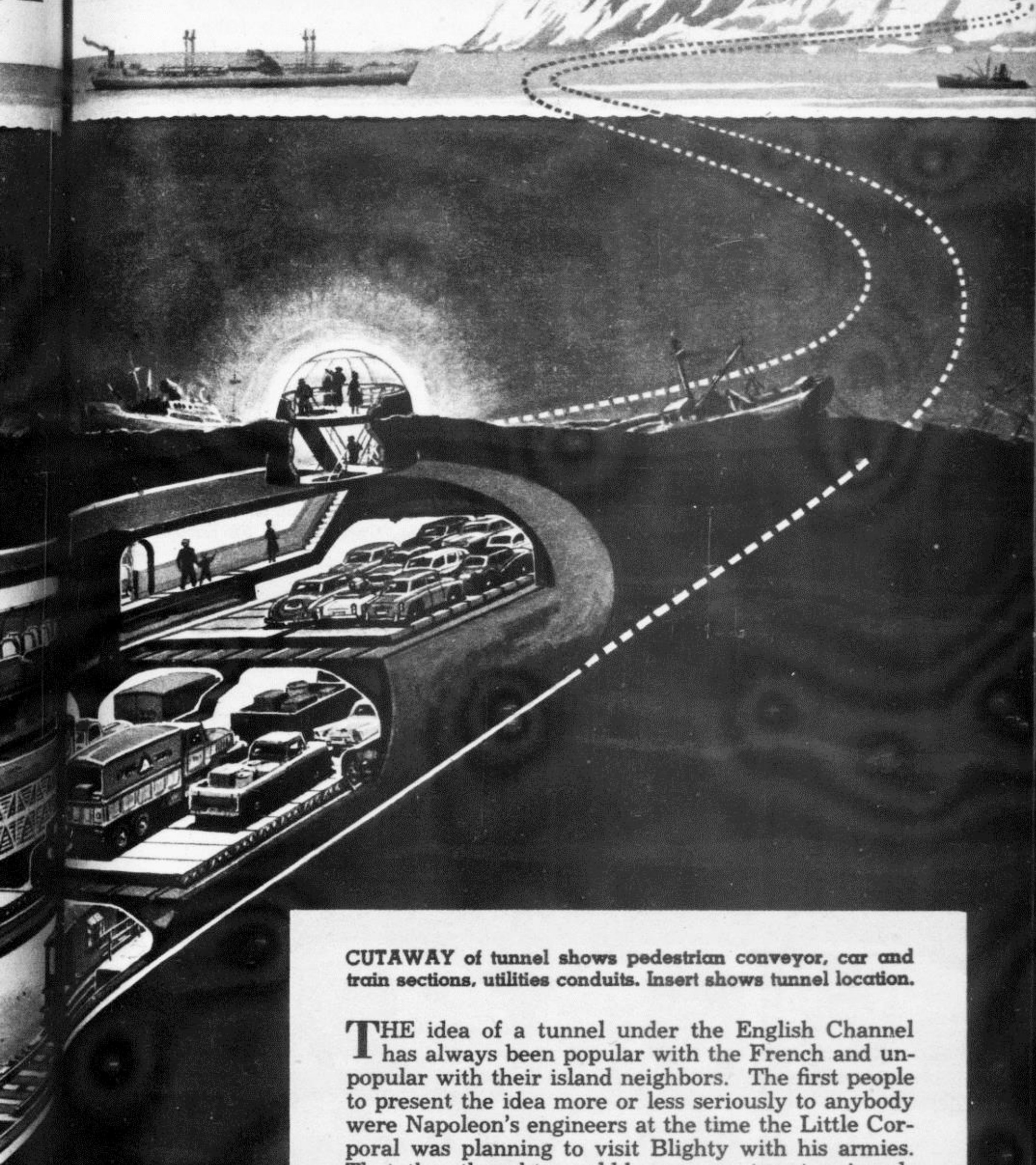
English Channel

By Frank Tinsley



FRANK TINSLEY '57

el Tunnel at Last?



CUTAWAY of tunnel shows pedestrian conveyor, car and train sections, utilities conduits. Insert shows tunnel location.

THE idea of a tunnel under the English Channel has always been popular with the French and unpopular with their island neighbors. The first people to present the idea more or less seriously to anybody were Napoleon's engineers at the time the Little Corporal was planning to visit Blighty with his armies. That, they thought, would be one way to get an invading army on English soil. The later French reasoning, that a channel tunnel would benefit trade, has never

allayed British fears of columns of ruddy foreigners walking calmly in under the Fleet.

But Zeppelin raids, the Battle of Britain and the perfection of guided missiles, atomic warheads and airborne invasion techniques have lessened the importance of Britain's ancient moat. Today it's chiefly a question of how to get the 6,000,000 annual channel crossers and the ever-increasing goods tonnage back and forth with minimum seasickness, delay and breakage.

One company interested in getting the job is the recently dispossessed Universal Suez Canal Company. Another is the British Channel Tunnel Company, which proposes a pair of railway tunnels and no auto tunnel because of the tremendous air-conditioning problem.

U. S. tunnel experience shows that

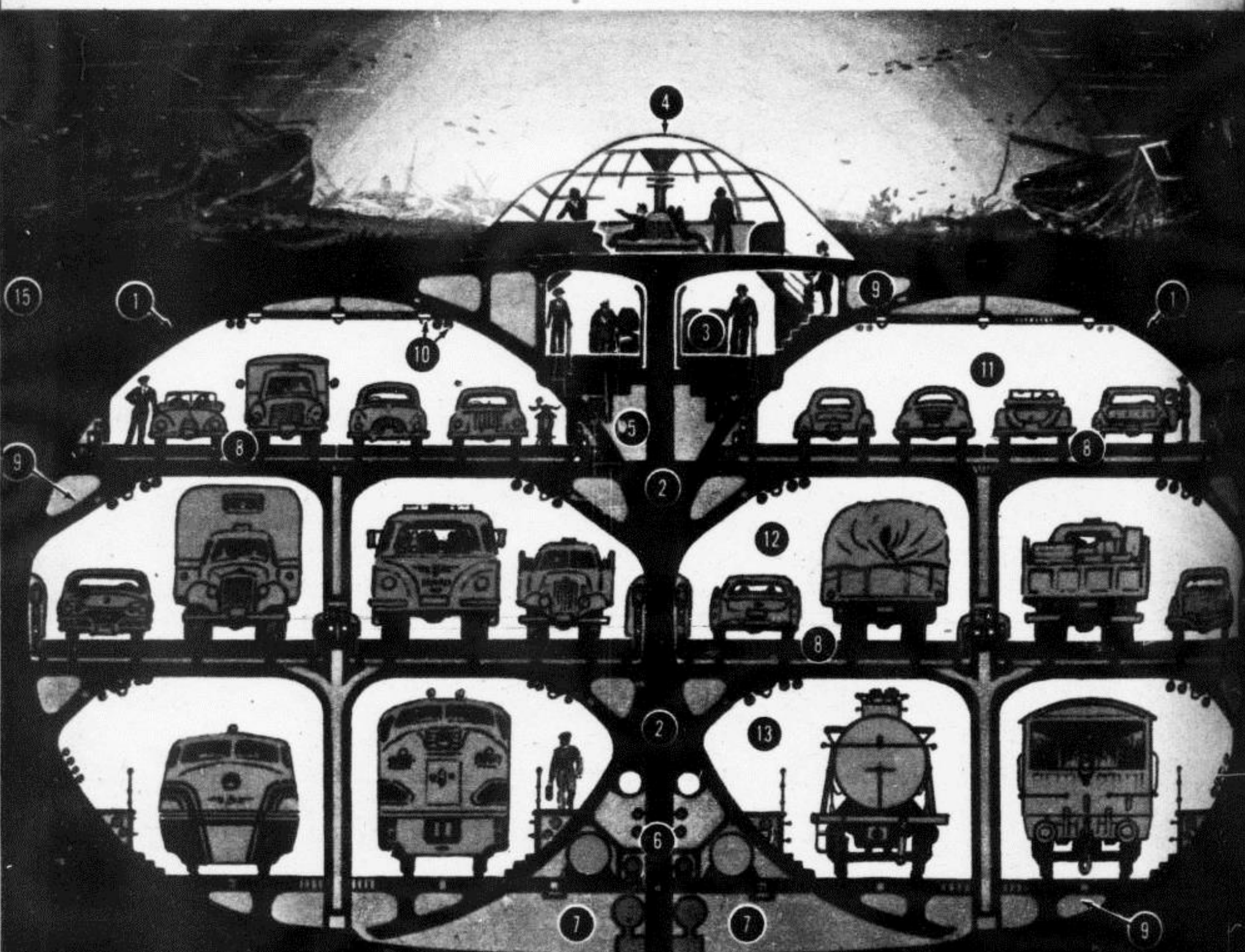
an auto tunnel would be a much sounder commercial venture, however, so MI's Channel Tunnel Committee have come up with a solution to the car exhaust problem in the 30-mile tube.

Briefly, we propose sending the cars through on a conveyor belt. The mechanical feasibility of this is established. A U. S. Army conveyor belt carrying unit loads up to 3,000 lbs. has already been built and demonstrated. It can go around curves and climbs grades as steep as 27 per cent. The novel feature of our channel tunnel conveyor would be its maximum speed, in the long stretch, of 30 mph. That would take a car from England to France in an hour—about twice the time of present air trips but much faster than boat crossings.

On the conveyors, cars can be placed bumper to bumper and hub to hub. Top

KEY: 1. Twin tubes, built separately; 2. Connecting structure; 3. Passenger conveyor; 4. Observatories; 5. Air ducts for passenger tunnels; 6. Power, oil, telephone lines and

mail tubes; oil lines are pink; 7. Bilge takes water from each tube separately; 8. Conveyor belts; 9. Air ducts; 10. Fluorescent lighting; 11. Upper levels for European-size



vehicle capacity of the completed plan will be more than 1,000,000 cars in 24 hours! Present loads and those of several years to come can be carried by a single tube, however, and the beauty of this plan is that one tube can be installed and put into use at first and the other built when demand is sufficient.

The placement of air inlet and exhaust ducts, power and lighting systems, signal wiring, catwalks and inspection passages, are shown in the drawings. Utility and transmission lines are grouped in the lower central connector and are accessible for inspection and repair at any point. The oil lines run through special liquid-tight compartments fitted with one-way valves that drain into the bilge below. Should a break occur, the lost oil can be recovered. This bilge area, traversing the

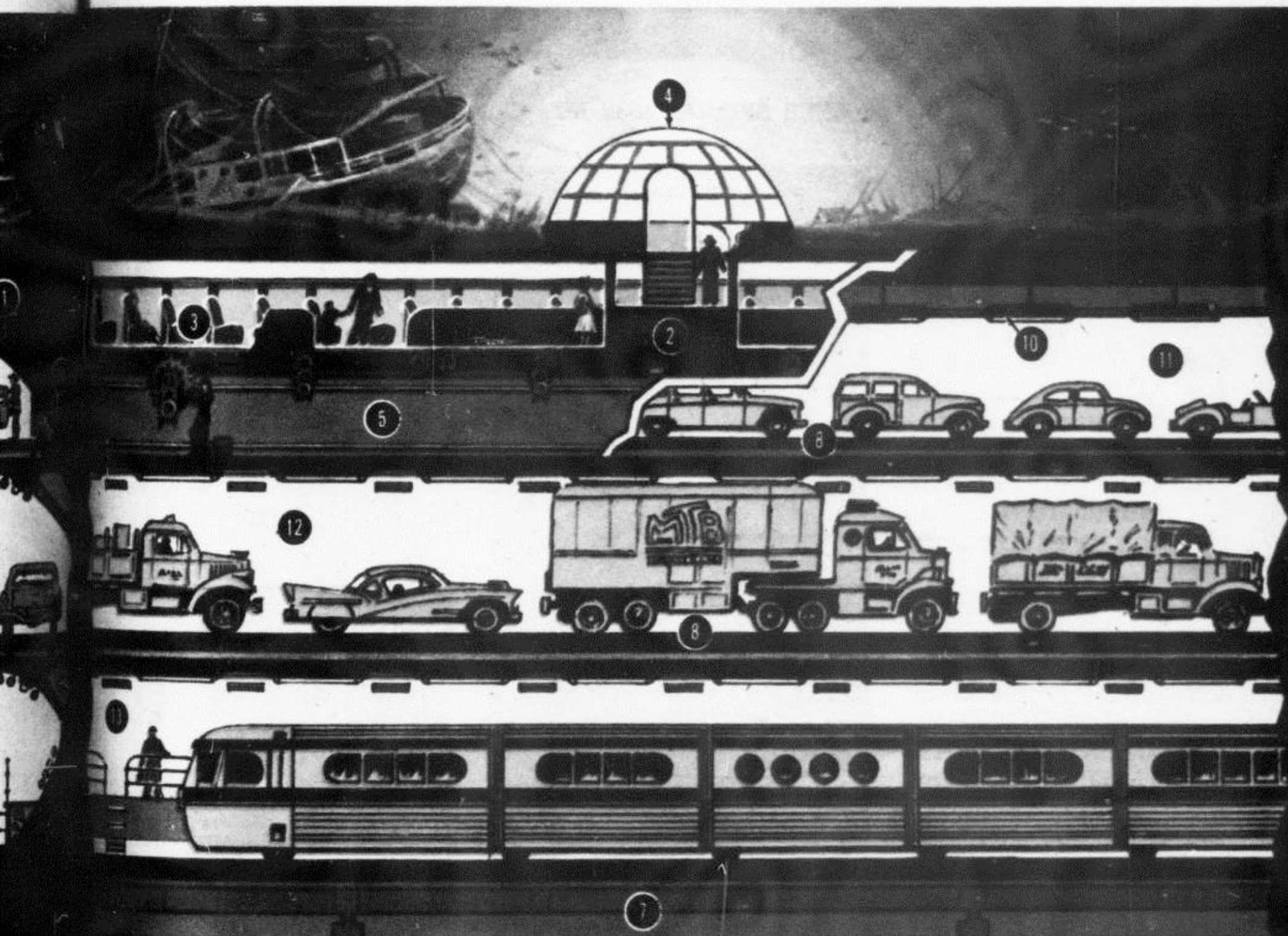
bottom of the tunnel structure, drains all levels separately and is capacious enough to handle almost any emergency flooding. Water collected in it flows downhill to the lowest point of the tunnel arc where an automatic pumping unit expels it into the Channel.

A four-track electric railway line occupies the lowest level of the tubes.

Set between the main tubes, in the upper section of the connecting structure, is a moving platform for pedestrian visitors. Entering from either end, the tourist is carried in comfort to a series of underwater observatories set at vantage points along the channel bed. From transparent domes projecting just above the silt, he can view the wreck-strewn bottom. An attraction such as this could earn a substantial part of the tunnel's income. •

cars, motorbikes, etc.; 12. Middle level for trucks, buses, American-size cars; 13. Two-track railways; 14. Power lines, motors, are red; conveyor platforms, drives and gear-

ings are brown; air ducts, bilges and access passages are gray; 15. The chalk bed of the English Channel. Its natural curve is followed by the curve of the MI tunnel.





**Brand new...and
bred for action!**

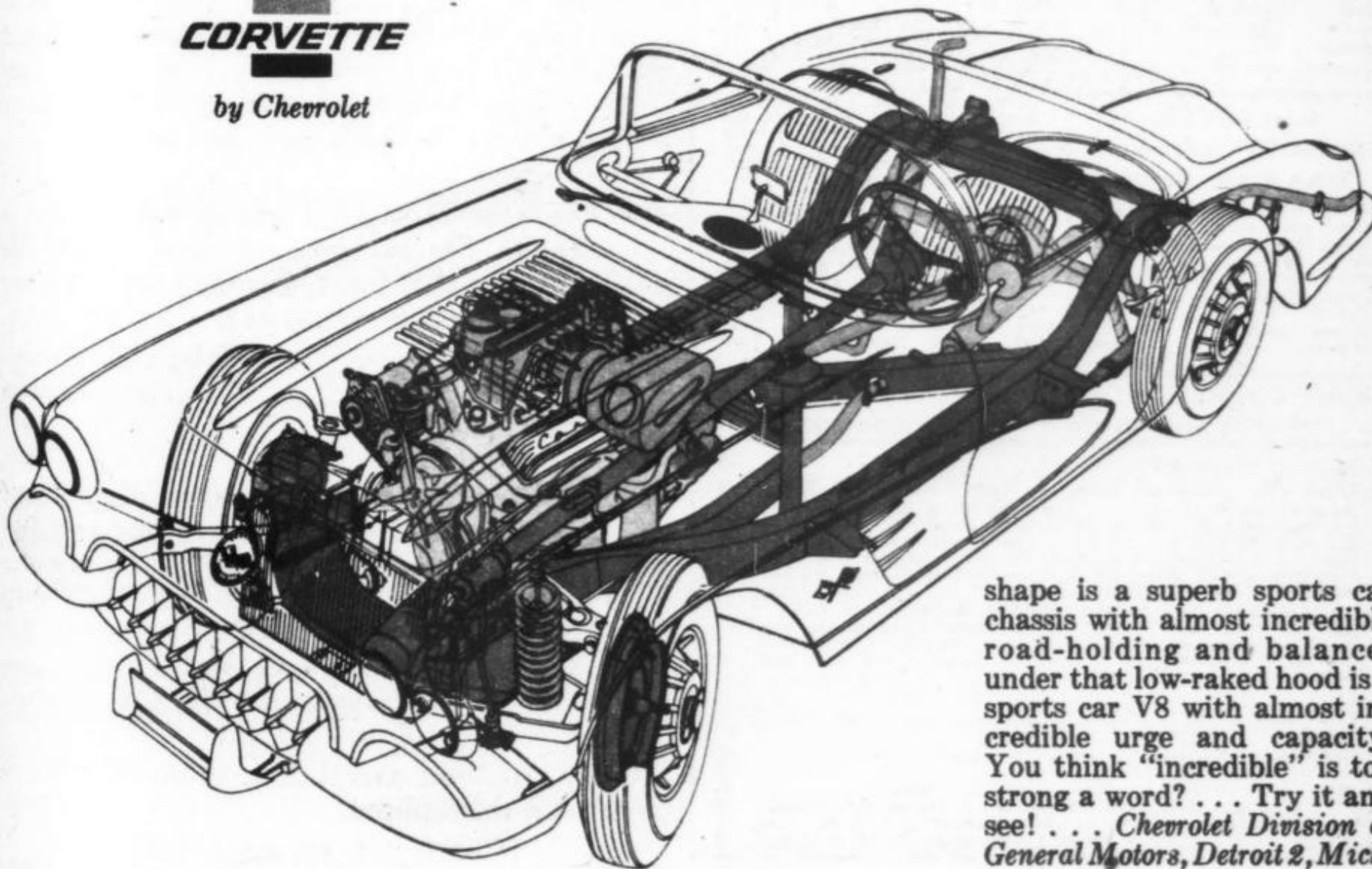
This is a very special car for special people with very particular requirements. We'll grant you it is as sleekly handsome a machine as ever whispered down a boulevard, with an individual flair that is shared by no other. And we'll also concede that its road manners are impeccable, that it moves with a glove-leather suppleness that is obedience personified.

But the real difference between the 1958 Corvette and any other American car is this: It is an authentic sports car. Under that wind-sculptured

corvette for '58

CORVETTE

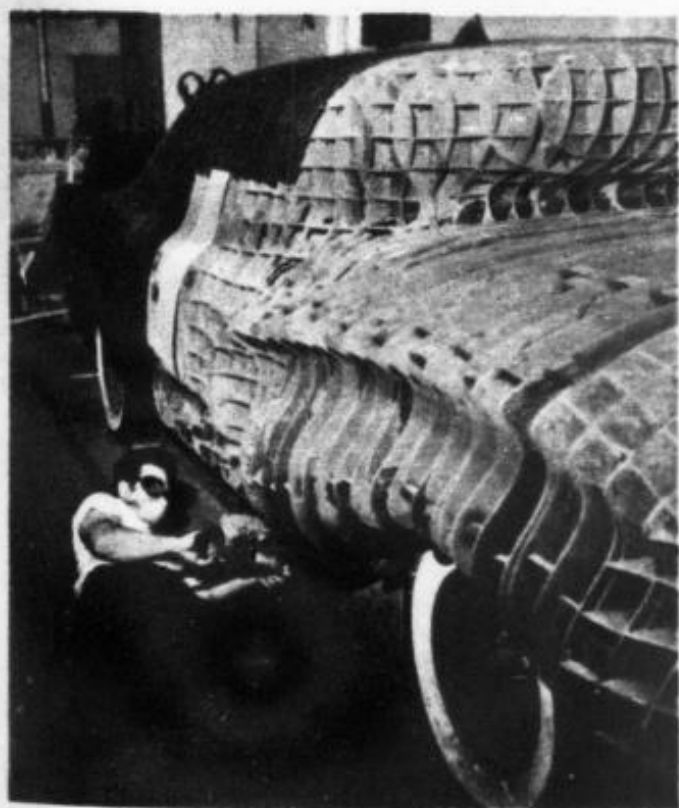
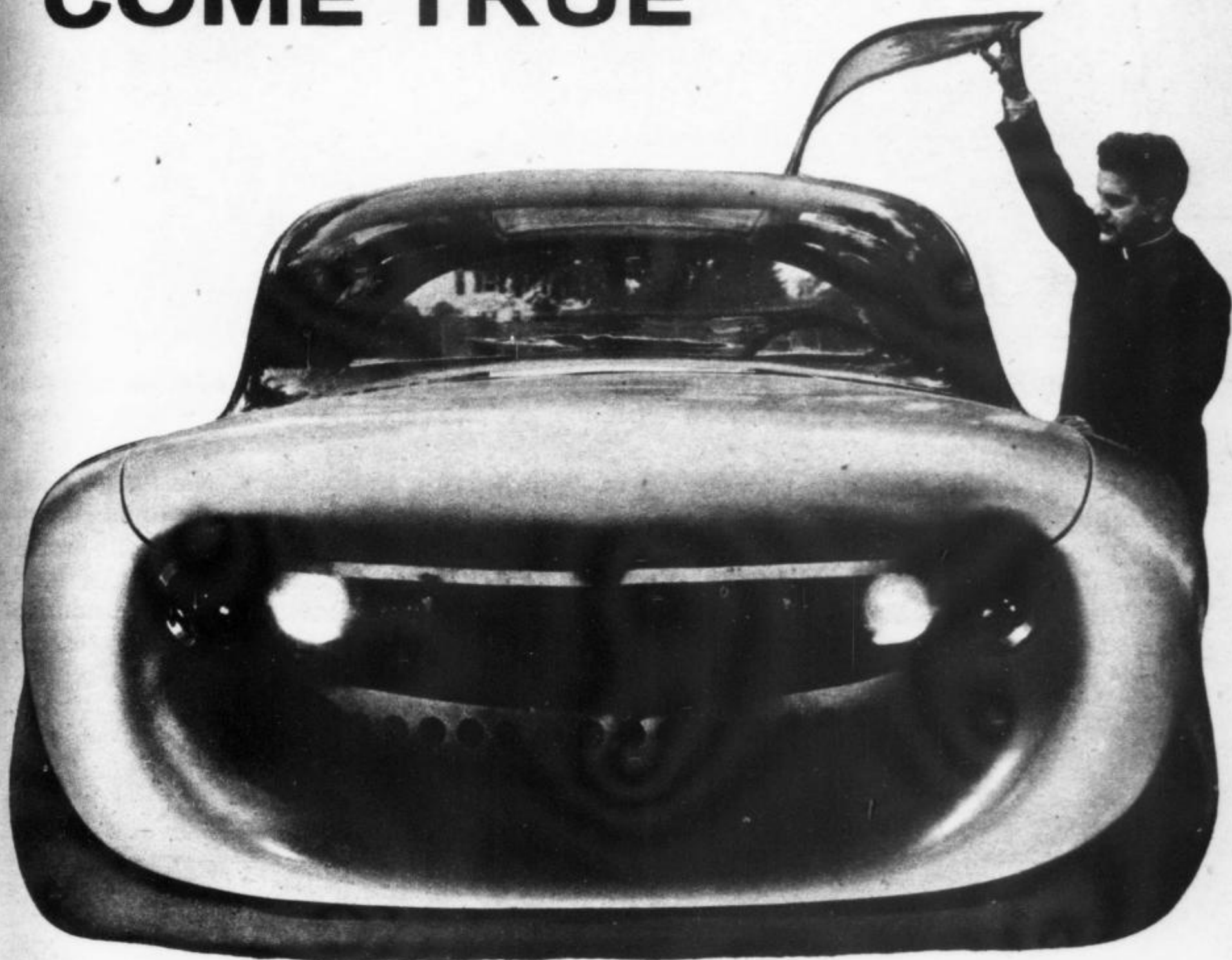
by Chevrolet



shape is a superb sports car chassis with almost incredible road-holding and balance; under that low-raked hood is a sports car V8 with almost incredible urge and capacity. You think "incredible" is too strong a word? . . . Try it and see! . . . Chevrolet Division of General Motors, Detroit 2, Mich.

When Answering Advertisements, Please Mention MECHANIX ILLUSTRATED

Dream Car **COME TRUE**



AURORA is the name of Father Alfred A. Juliano's dream car. The car-building priest of Branford, Conn. is said to have produced the first custom car in the United States with radical safety innovations and air conditioning incorporated in its basic design.

Conceived, invented and built by the Father, the highly unorthodox Aurora is an 18-ft. long plastic-bodied car that was two years on the drawing boards and required three years to build. It was featured in Feb. '56 MI in a story titled Meet Father Juliano. The Aurora with its

FATHER JULIANO as he appeared in Feb. '56 MI when he was still building his dream car.



BIG BUBBLE windshield is set two feet further forward than conventional ones. Its design is stronger, safer, gives good visibility in any kind of weather, it is claimed.

dent-, rust- and corrosion-proof body is specifically planned for long distance highway travel. The vehicle has a tinted, transparent astrodome roof with interior metal shades which adjust overhead. Its stainless steel, racing-car-type roll-over bars located beneath the roof are

designed to protect the passengers.

The conventional grille has been discarded in favor of a large, front end air scoop which houses its multiple headlights. The spare tire, located under the hood, is on a platform which extends to lower the tire to the ground without



AURORA has Fiberglas body, tinted transparent astrodome roof. Bumpers are triple-action shock absorbers with four-inch give.

1. INSTRUMENTS are recessed in deep sockets for greater safety.
2. Curved firewall directs airflow to exhaust ducts to improve cooling.
3. Taillights are enclosed in small greenhouse.
4. Rear view shows simplicity of design. As spare is kept under front hood, uncluttered trunk affords 20 cubic ft. of storage space.





HINGED HOOD opens from front. Buyers have choice of power plant when they order.

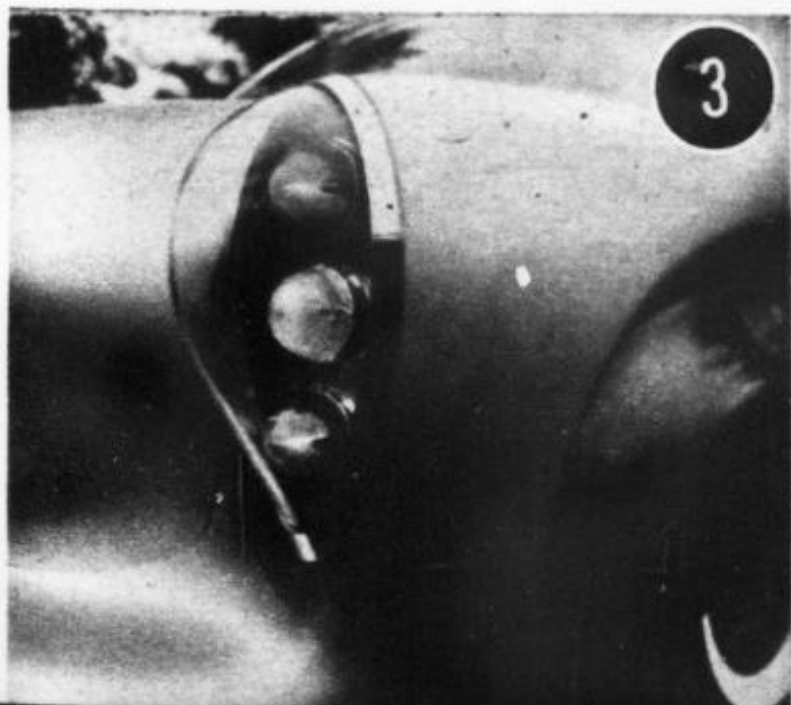
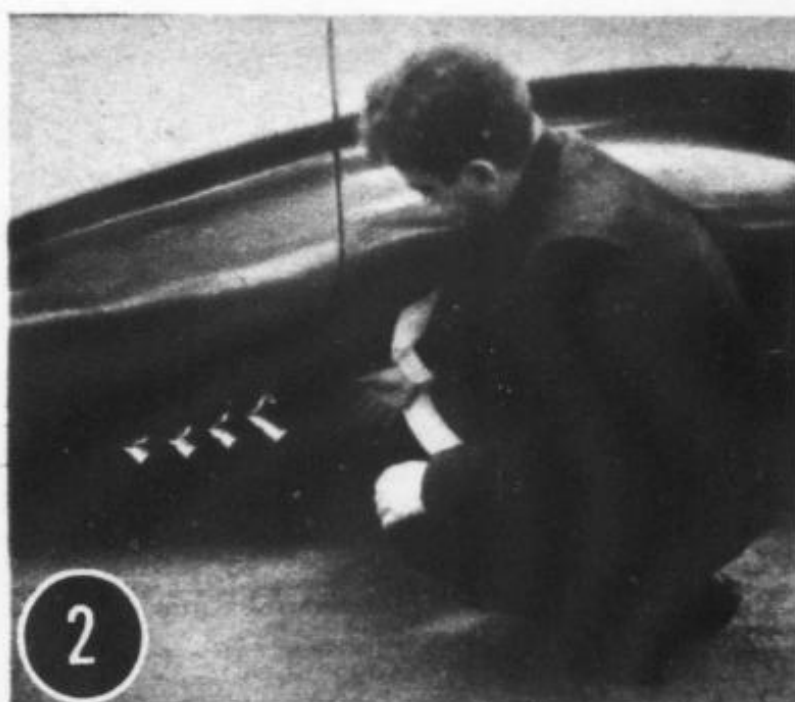
handling. Dash-controlled hydraulic jacks in the steel frame make tire-changing an easy chore.

The Aurora is equipped with safety bars on the front and rear seats, a telescopic steering column that collapses on impact and shock-resistant doors. All

DASH is foam rubber cushion eight inches thick, safety-designed to prevent injury.

hardware including door handles is flush with the body and a heavy shock padding lines the interior.

The custom car sells for \$12,000. According to Father Juliano, "The Aurora is the safest car in the world; it will save many lives." •



U.S. WANTS TO BUY 300 NEW INVENTIONS—NOW!

MECHANIX ILLUSTRATED

THE HOW-TO-DO MAGAZINE

25¢
JULY

Coast-To-Coast Nonstop In
M's FABULOUS FAMILY CRUISER
See Page 70

David Lockheart

RE-CONDITION YOUR CAR FOR \$50
EASY NEW WAY TO BUILD A HOUSE
BE A MODEL RAILROAD TYCOON!



MECHANIX ILLUSTRATED

A FAWCETT PUBLICATION

"HOW TO" HIGHLIGHTS IN THIS ISSUE

- How To "Panelize" Your New Home
—Page 66
- How To Air-Condition Your Car
—Page 108
- How To Repair Tubeless Tires
—Page 142

SPECIAL FEATURES

Solving The World's Top Secrets	O. O. Binder	53
How To Be A Hobby Printer	J. Robert Connor	61
"Panelize" Your New Home	John L. Springer	66
MI's Highway Cruise Car (Cover)	Robert G. Beason	70
Spaceship That Conquers Gravity	Michael Gladych	98

TOM McCAHILL

Tests The Imperial	86
Tests The Goggomobil	90
Mail For McCahill	176

REGULAR FEATURES

Inventions Wanted—By Uncle Sam	56
MI's Bright Idea Award: Port-A-Hose	69
Hunting & Fishing: Fooling The Cagey Walleye Wynn Davis	78
It's New!	80
Eye-Stopper	93
MMI: Big Profits From Little Pigeons Jack B. Kemmerer	96

SHORT FEATURES

Jet-Styled Ford	58
Passing Fancy	59
Go Paint An Egg	60
Rembrandt Of The Zoo	64
Tomorrow's Clocks Today	76
Baby Steamer/Baby Possum	77
Flying Watchdog	84
\$50,000 Worth Of Music Boxes	89
Be A Miniature Railroad Tycoon	94
Air-Conditioned Crib	101
They Rebuilt America's Most Historic Bridge	102
Indoor Shooting For Fun	104

DEPARTMENTS

It's Coming!	8
Invention Clinic	12
Dear Editor	26
Conquest Of Space: Three Ways To Do The Job G. Harry Stine	30
Speaking Of Jobs: The Antennologist	39
So You Think It's New!	43
Science Shorties	47
Patents Granted	49

(continued on page 6)

JULY 1957

W. H. FAWCETT, JR. president
ROGER FAWCETT general manager
ROSCOE K. FAWCETT circulation director
GORDON FAWCETT secretary-treasurer
RALPH DAIGH editorial director
JAMES B. BOYNTON director of advertising
AL ALLARD art director
RALPH MATTISON associate art director

WILLIAM L. PARKER editor

ROBERT G. BEASON assistant editor

LAWRENCE SANDERS feature editor
J. ROBERT CONNOR news editor
HARVEY GARDNER science editor

ROBERT BRIGHTMAN home & shop editor
JOHN J. SMITH associate editor
DICK HOWE associate editor

FRED COSPITO art editor
MARK BINN art associate
BILL FLEMING art associate
JERRY CURCIO art associate

HELEN E. SLOWIN production editor
JOHN WEBSTER east. adv. mgr.

VOLUME 53, NUMBER 7

Permission hereby granted to quote from this issue of this magazine on radio or television, provided a total of not more than 1,000 words is quoted and credit is given to the title of the magazine and issue, as well as the statement, copyright 1957, by Fawcett Publications, Inc.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., Fawcett Building, Fawcett Place, Greenwich, Conn. Editorial offices: 67 W. 44th St., New York 36, N. Y. Advertising offices: 67 W. 44th St., New York 36, N. Y.; 612 N. Michigan Ave., Chicago 11, Ill.; Townsend-Millsap, 672 S. Lafayette Park Place, Los Angeles 57, Cal. and, 110 Sutter Street, San Francisco 4, Cal.; 1659 Guardian Bldg., Detroit 26, Mich.; Hale Printup Asso., Langford Bldg., Miami 32, Fla. Entered as second class matter at the post office at Greenwich, Conn., under the act of March 3, 1879, with additional entry at Louisville, Ky. Printed in U. S. A. Title registered in the U. S. Patent Office. Copyright 1957 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Address manuscripts to New York editorial office. Unacceptable contributions will be returned if accompanied by sufficient first class postage. Not responsible for lost manuscripts or photos. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to MECHANIX ILLUSTRATED Circulation Dept., Fawcett Place, Greenwich, Conn. Price 25c a copy. Subscription price \$3.00 per year in the U. S. and possessions and Canada. All other countries \$6.00 per year. Subscription price to members of the armed forces \$2.75 per year. Foreign subscriptions and sales should be remitted by International Money Order in U. S. funds payable at Greenwich, Conn.

MEMBER AUDIT BUREAU OF
CIRCULATIONS

Cover painting by David Lockhart
Cover photo by Rudy Arnold

MI's Highway Cruise Car

You'll be glad you left home when you take a trip in this luxurious and high-speed living room on wheels.

AUTOMOBILES apparently have reached a crossroads so far as size is concerned. Years of slow, redwood-like growth among major models came to a halt in 1957 and a few cars even began shrinking. Manufacturers now are faced with a dilemma: bigger or smaller? Out of the quandary may come some of the most revolutionary ideas since men first started putting air in tires.

Very large cars are public favorites for long-distance trips but are hard to handle in city traffic. Small foreign-type sports jobs, while not the ultimate for cross-country tours, are excellent for town travel. Most autos now on the road are compromises with a little of both ideas in the design. They're adequate for either purpose but outstanding at neither.

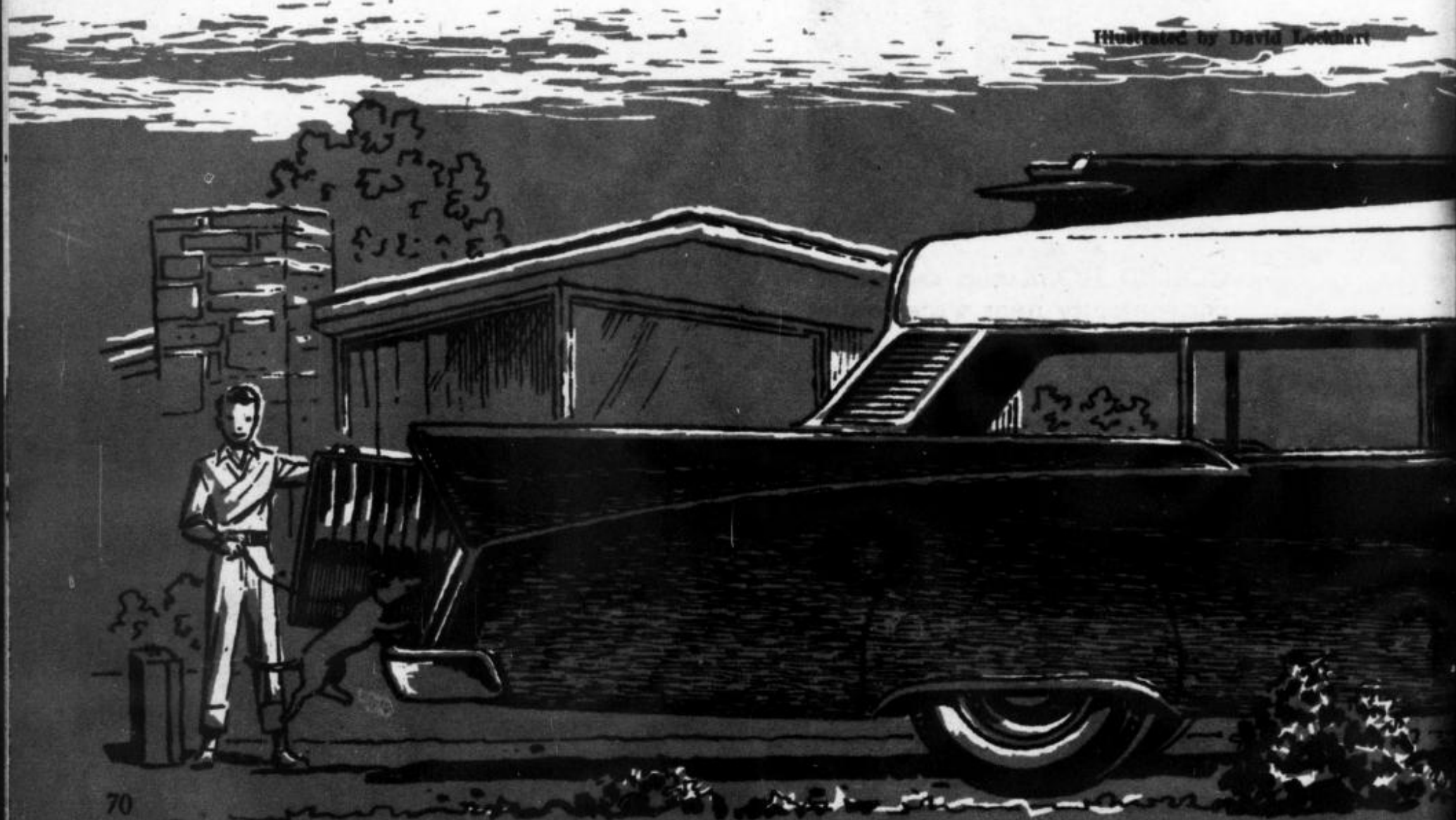
An answer to the problem may be found by producing totally different classes of cars, each for a specific pur-

pose. Stylists then could match a car more closely to the special use for which it is intended. Edmund Anderson, director of styling for American Motors, sees the emergence of three basic designs.

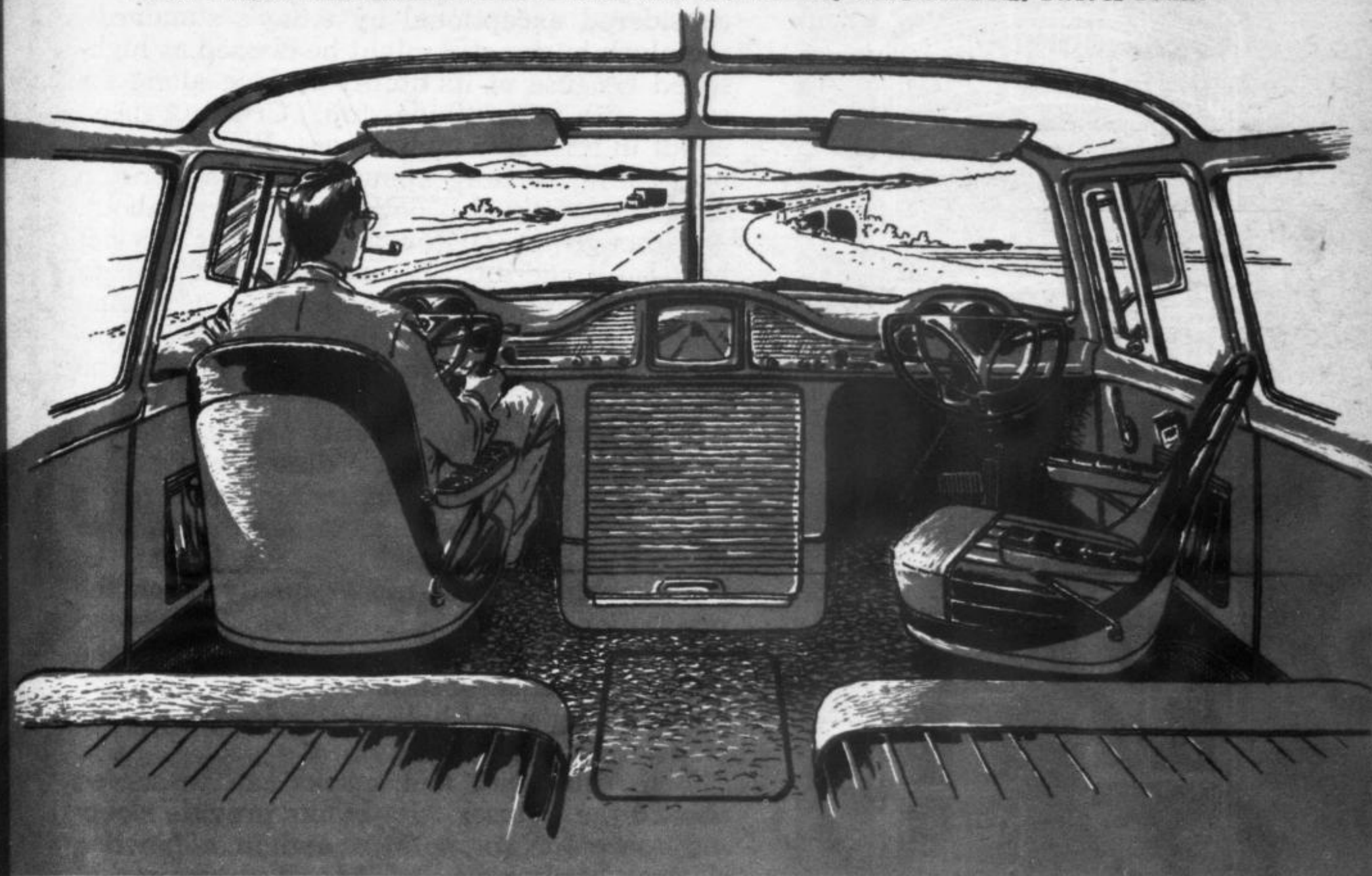
"One is the personal or sports car," he says. "The second is a compact car and the third is a large, long-distance family car which seats several people comfortably and is used to transport the family on long trips and vacations."

On these pages MI presents its concept of the most revolutionary of the three types—the Highway Cruise Car. Our air-conditioned living room on wheels, carrying six, eight or even more, would be a paradise on long trips. After completion of the current federal highway building program it could go virtually anywhere in the country on a spider web of limited-access expressways.

This Hercules of the highways would



VIEW FROM THE BRIDGE shows rear-view TV screen, dual controls, swivel seats.



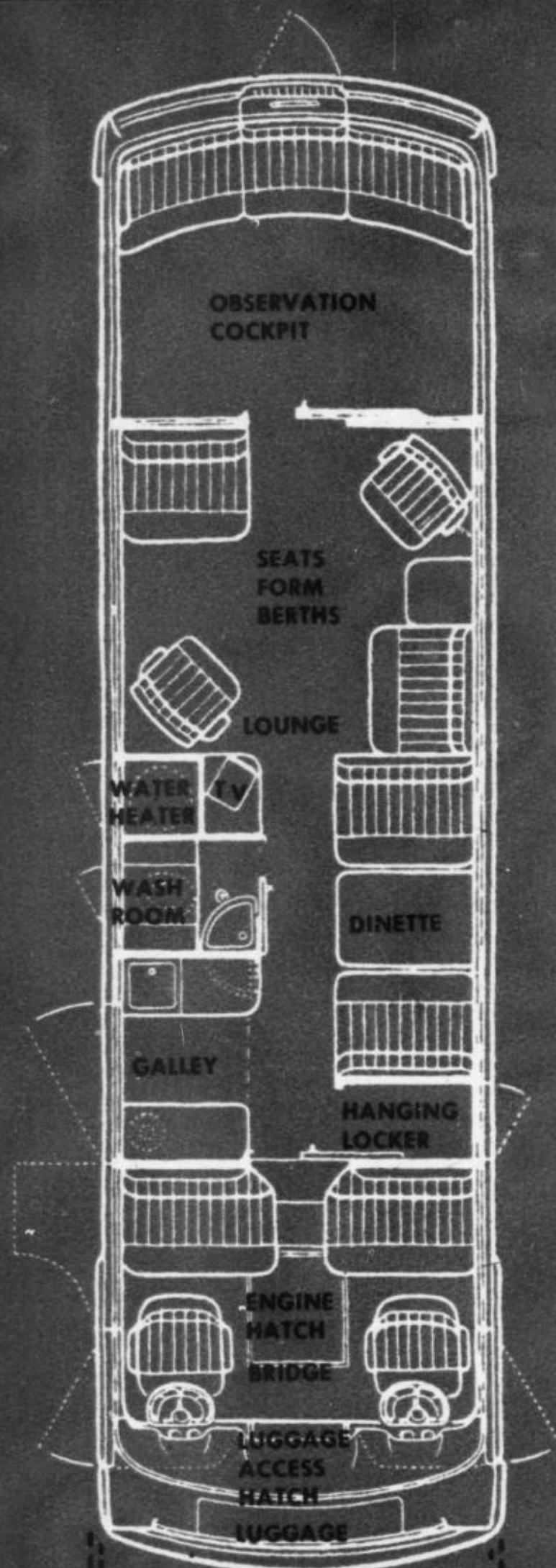
not be pleasant to wheel through city streets but fortunately urban driving would be encountered only at the beginning and end of a trip. The design readily fits into the current pattern of more and more multi-car families. For driving to the office or taking a spin on

secondary roads, the man of the house might have a small sports car. The middle-size compact model would be used by his wife for taking the children to school or carrying groceries.

MI's Cruiser is designed for just one purpose—comfortable travel for long

OUTSIZE Cruise Car has many access doors and hatches, luggage space in the nose.





distances. While its top pace could not be considered exceptional by today's standards, the plush buggy still might be classed as high-speed because of its ability to lope along for hours with not a single stop. Cruising speed is put in the 70-75 mph range. Pickup would be nothing to brag about but on a nonstop expressway it's also nothing to worry about.

Although the Highway Cruise Car has not been built and must be regarded as a concept for the future, there is nothing in its design that is not currently available. No new technical developments are necessary to make the idea a reality.

Power plant requirements suggest the use of a diesel engine because diesels can hold a high rpm pace for long periods and never work up a head of steam. A gasoline turbine or free-piston mill might be adapted to the Cruiser when these engines finally reach the production stage.

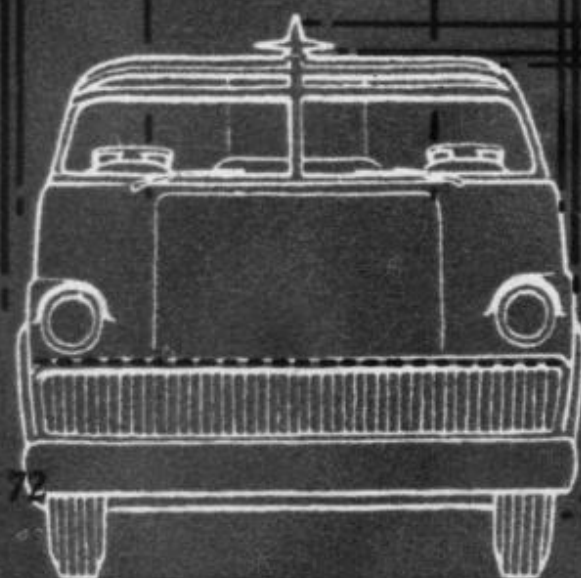
Sleeping and eating accommodations make possible a Massachusetts-to-Oregon trip without one over-night halt and, indeed, only one stop for refueling!

Both full meals and snacks can be served aboard the Cruiser. Its bunks provide sleeping space for six persons and in a pinch a seventh bunk can be added. With every seat filled the car actually could hold 20 people, although this would be considered beyond its comfortable capacity. Maximum load with all bunks and seats occupied is 13.

Let's take a closer look at the luxury land yacht. Its size strikes your eye first. Instead of today's 18-ft. lengths, the Cruiser is 25 to 30 feet long and up to eight feet wide.

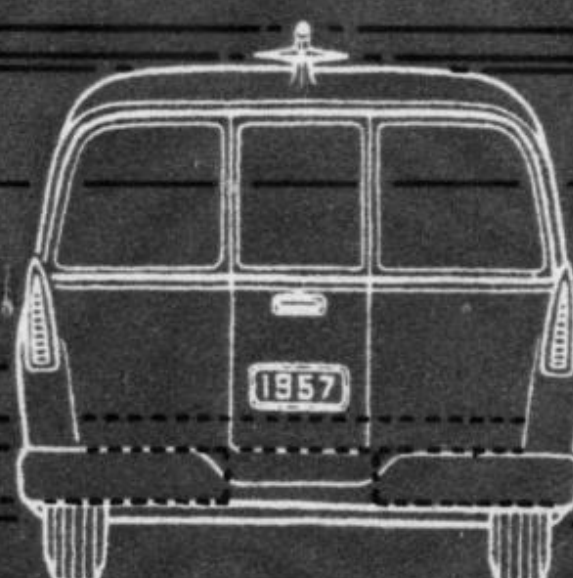
Driver's Bridge: The bridge sits atop the engine and is covered with steel-hard glass to give the operator full visibility from his high position in the snub nose. Lamination prevents glare and over-heating from the sun. A remarkable feature of the bridge is its dual controls—a full set on each side. No slackening of speed, let alone a stop, is required when

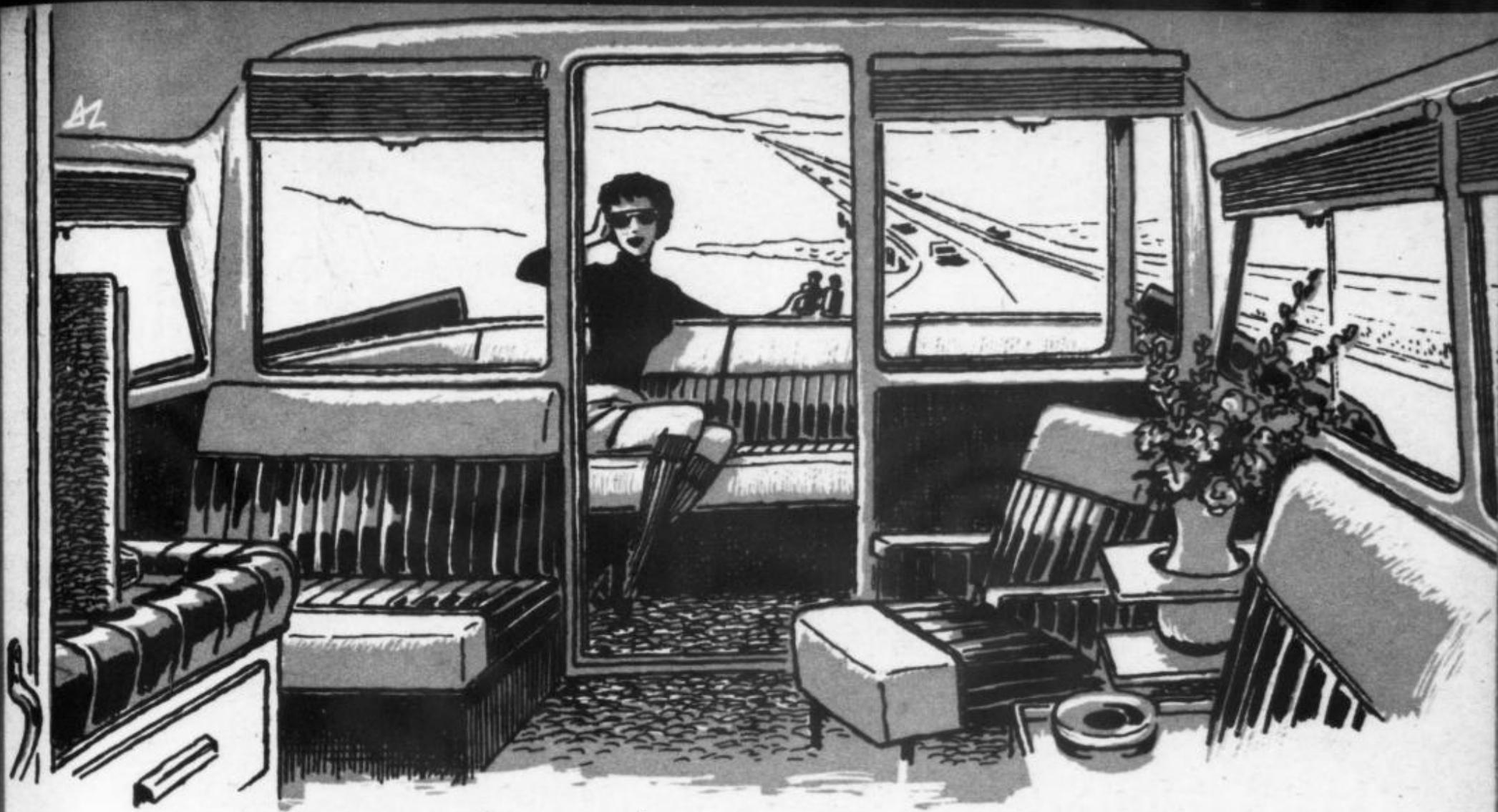
EFFICIENT LAYOUT of Cruiser makes



FLOOR LEVELS

BRIDGE
COCKPIT
MAIN AISLE
GALLEY & WASHROOM





OBSERVATION COCKPIT, an open-air sitting room, can be protected with a canvas top in the summer and is closed in with a plastic bubble in winter. Lounge is in foreground.

a relief driver takes over. The new operator merely slides into the unoccupied front seat, control is transferred to him and he starts driving. Control can be switched to either side by flipping two selector levers located on the dash near the left and right steering columns. For the sake of safety, each driver must throw the lever on his side before the change is complete. The steering wheel and pedals not in use do not monitor the other set, as in dual-rigged airplanes, because of the danger that someone might accidentally grab the unused wheel and cause the driver to lose control.

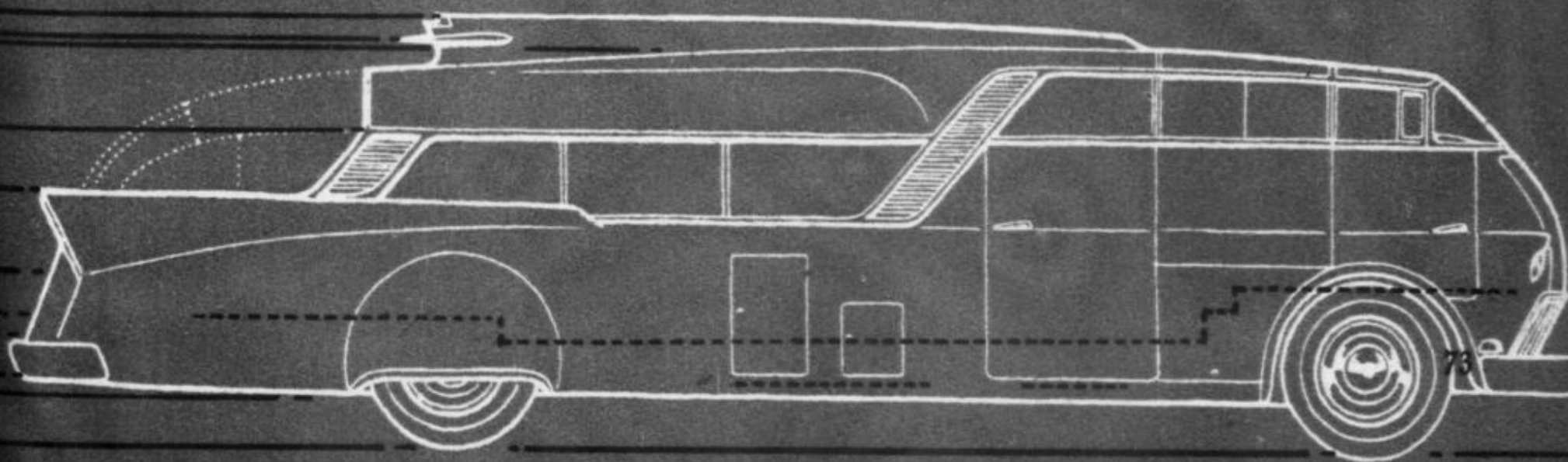
The driver seats are basically the airplane type with armrests added.

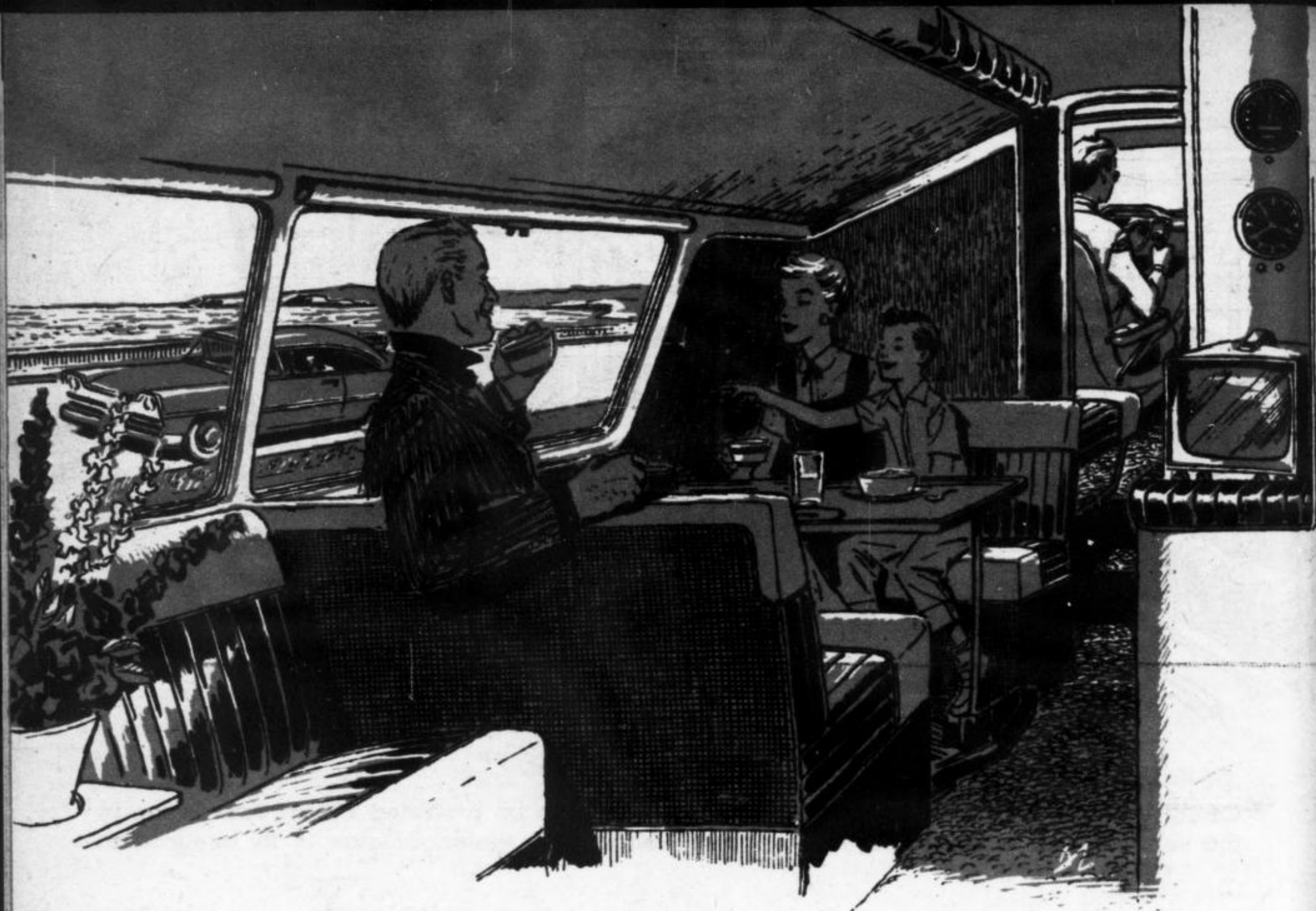
They pivot both ways to aid a person getting into one of them from the aisle or through either front door.

Intercom microphone-speakers are mounted in the center of the steering wheels, connecting the bridge with stations in the lounge, galley and cockpit. The circuit also is hooked to the radio and record-player.

Rear-View TV: A small television screen on the dash directly between the driver positions probably has caught your eye by now. This is a closed-circuit receiver showing images from a camera mounted on the rear of the Cruiser and trained on the lane directly behind, giving either driver perfect rear vision. Large exterior rear-view mir-

maximum use of inside space. Four bunks are provided by lounge, two by dinette.





DINE-AS-YOU-GO feature puts an end to time-killing restaurant stops. Snacks or full meals can be provided by galley opposite the dinette.

rors cover adjacent traffic lanes and their ranges change automatically when control is switched from side to side.

Access to the luggage compartment in the nose can be gained through a hatch on the bridge or an outside opening. Other hatches in the bridge deck and on the right exterior permit easy servicing of the engine and the air-conditioning unit positioned beside it.

Against the bridge's rear bulkhead are two passenger seats for those who like to watch the road ahead. Mounted beneath them are twin tanks supplying water for drinking, cooking and the washroom. The bulkhead is sound-proof to cut distracting noise to a minimum if the driver desires quiet.

Now slide open the bulkhead door (all interior doors slide rather than swing for reasons of safety) and go down one step. Here is enough comfort to satisfy even the almost insatiable American appetite for luxury.

Bar-Galley: Immediately to your right is a large, deep closet for hanging clothes. Opposite it is a bar (for those

not scheduled to take the wheel) combined with a compact galley that serves tidbits or complete meals. When you enter the Cruiser through the center door you walk between the counters of the bar-galley.

Stowed under the counters are tanks of liquefied gas for the cookstove and water-heater.

Dinette: A couple of steps down the aisle bring you to the dinette on the right. Heavily cushioned seats provide dining comfort for four persons. Perhaps your wife and three friends with you on this trip have started a rubber of bridge. The table doubles for gaming or letter-writing. At night the dinette becomes two bunks—upper and lower. Bedding is stored under the seats.

Washroom: Across the aisle is the washroom with complete toilet facilities. This whole compartment becomes a shower stall when you slide the triangular lavatory into the wall. A hatch on the outside gives access to the chemical sewage tank.

Just aft the washroom are the water-heater compartment and the buffet holding the TV set and the hi-fi equipment.

Lounge: One more step brings you to the travel car's *pièce de résistance*, the lounge. Thick-piled carpeting covers the deck, muffling noise as well as being restful on the feet. Two swivel lounge chairs and two divans offer rest and relaxation. You can read, watch TV, listen to records or simply sit and watch the landscape peel by. All bruise-producing corners and seat backs in the lounge, as well as elsewhere, are padded for safety.

Observation Cockpit: Sliding open another bulkhead door, you step onto the observation cockpit, an open-air fantail fitted with a lounge seat that curves around the back. It has special appeal for the person who likes to feel the breeze on his face. The cockpit can be left open in summer. When foul weather strikes, a canvas top stowed under the seat fits quickly into place. The windows roll up to meet the top. In winter a plastic bubble mounts over the cockpit to close it in. A section of the lounge seat swings up to allow passage through the rear door.

In an emergency the cockpit seat can be made into a bunk for one person.

Stabilizer: Exhaust fumes never bother you on the fantail because these gases are vented through the large stabilizer on the roof. A small fin on the stabilizer deflects the exhaust skyward and away from the car. Also housed in the stabilizer is the TV antenna, controlled by a compass which keeps it

CANVAS TOP and the operative side windows are foul weather guards. Stabilizer holds TV antenna and exhaust vent, fin deflects gases.

trained to a given direction regardless of turns.

Besides its comfort, the Cruiser incorporates a high degree of safety. The body has a low center of gravity that makes overturning practically impossible.

Some car designers have looked even farther into the future and added some yet-to-be-developed features into the Cruiser type vehicle.

Before many more years have passed a safety device called radar brakes will be in use on American cars, from all indications. This equipment scans the road ahead and senses any obstacle in its path. If there is danger of hitting another vehicle or some other object the radar brakes automatically slow or stop the car.

Steering control itself could be built right into the highway. The automatic driver system has been successfully constructed in pilot form by General Motors and one day could conceivably become a part of every American super-highway. An electromagnetic strip running down the middle of each lane transmits signals to cars. These control its steering and speed. The impulses come from control stations spaced along the road to handle all traffic.

—Robert G. Beason •



Spaceship That

.....



Conquers Gravity

By Michael Gladych

*It will fly at the speed of light—making
a round-trip to Venus in about 30 minutes!*

THE spherical craft squatting on a concrete strip emitted a faint hum. A ghostly glow surrounded its shell. The strange craft rose and hovered momentarily while its landing gear retracted. Then the hum increased and the craft shot eastward and vanished beyond the horizon before the witnessing scientists could click their stop watches.

Jet-powered missile? No. Made weightless and propelled by its anti-gravity engine the round ship was a research vehicle able to travel at almost the speed of light—600,000,000 mph.

How soon will such a revolutionary craft take to the skies? Since 1953 the Canadian government's Project Magnet has been working on a gravity-defying vehicle powered by electromagnetic forces. At least 14 United States universities and other research centers are hard at work cracking the gravity barrier. And backing the basic research with multi-million dollar secret projects is our aircraft industry. Convair on the west coast, Glenn L. Martin Aircraft Co. of Baltimore, Md., Bell Aircraft Co. of Buffalo, N. Y. and Sperry Gyroscope Co. of Great Neck, L. I. maintain teams of researchers and engineers prying into Nature's most jealously guarded secret—gravity. "Aviation is on the threshold of amazing new concepts," said the late Lawrence D. Bell, level-headed builder of the Bell rocket research planes. "We are already working with nuclear fuels and equipment to cancel out gravity instead of fighting it."

Even before the famous apple fell on Isaac Newton's head, men were trying to solve the gravity problem. But from the simple pre-historic lever to the most intricate modern machinery, the best we could do was to win a temporary victory.

"What goes up must come down," said the biggest scientific brains, helpless before the mysterious gravity pull. Newton and other great physicists formulated the gravity laws, measured gravity pull and passed their findings to posterity.

But their gravity "laws" had several exceptions that bothered inquiring minds. Take the strange behavior of liquids, for example. Move your fingertip slowly toward the surface of water and watch the water jump up to hug your finger. Or put a soda straw into the water and see the water level inside creep above the outside level in defiance of the earth's gravity pull. To get an even more striking contradiction of the gravity laws, drape a towel over the edge of a basin half-filled with water. After a time the water will climb up the towel and over the side. These and other strange anti-gravity tricks were considered freaks of molecular attraction—phenomena quite apart from gravity—until Albert Einstein came up with his Theory of Relativity.

Einstein said that molecular attraction is really no different from the gravity pull of the planets and stars. He theorized that this attraction works on the same principle as electromagnetism. A molecule, a planet or a star all have gravitational fields just as magnets or electromagnets have their magnetic fields. To illustrate the similarity, Einstein said that a gravitational field would attract and bend light rays just as a magnetic field bends cathode rays in your TV picture tube.

Dr. Stanley Deser and Dr. Richard Arnowitt of the Princeton Institute for Advanced Study have recently discovered new sub-nuclear particles of the atom. Bombarded by powerful electro-

ANTI-G SPACESHIP heads for the stars using ion rocket to control direction. The outer shell is transparent in drawing to reveal the inner artificial gravity wheel for crew.

magnetic accelerators such as the Cosmotron and Betatron, atomic structure yielded strange particles which may be the answer to the gravitational field problem. "Until recently, gravitation could be only observed but not experimented on in a controlled fashion," Drs. Deser and Arnowitt wrote in their scientific paper. "But the new particles of atom which have been linked with the gravitational field can now be examined and worked with at will."

The new discovery means that before long we shall be able to switch gravity on and off as we do electricity and electromagnetism. The next logical step is a matter of engineering.

Let's take an ordinary fly-wheel suspended on roller bearings and coupled with a powerful electric generator. One side of that wheel would be "under fire" of our de-gravitating apparatus. The particles responsible for the gravitational attraction would be neutralized, a portion of the wheel would be made weightless. But once out of the anti-gravity field, the same part of the wheel would gain weight and be pulled down by earth's gravity, thus giving us a powerful rotating motor.

Another idea for an anti-gravity device comes from Dr. George Rideout, president of the Gravity Research Foundation of New Boston, N. H. "To make a gravity motor," said Dr. Rideout, "we need a differential of gravity forces and the way we can get it is through a gravity insulator or absorber." To see how this device might work, let's turn to gravity's twin brother—electromagnetism.

For years we've had trouble with watches that get magnetized. You made a phone call or tinkered with your car's

generator and presto—the delicate balance wheel of your watch, exposed to an electromagnetic field, became a little magnet. Now your watch was no longer a reliable timepiece. To protect a watch from magnetic influence, we put the inner works in a soft iron casing that absorbs the magnetic force and shields the balance wheel. In other words, within the soft iron casing we have a space free from the outside magnetic pull—we have a differential of magnetic forces.

A gravity absorber or shield would do the same for the anti-gravity spaceship. The shielded interior would be free from the earth's gravity attraction. The inner structure, equipment and crew would be weightless in relation to the earth. Thus, we would have a differential of gravity forces and our ship would take off instantly like a super-balloon.

For ease of calculation, suppose we take our G-ship to the equator

where the rotational speed of the earth is about 1,000 mph. With our anti-gravity shield completely shut, the G-ship would be hurled into space just as a particle of mud shoots off a spinning tire. We would scoot along a more or less straight line unless we had some way of controlling direction and speed.

The weightlessness of the G-ship could be easily controlled by letting some of the earth's gravity force act upon the ship's interior. An arrangement of shutters like venetian blinds would do the trick. To control our direction, we would need thrust. A rocket would limit us to the amount of fuel, so let's try something else.

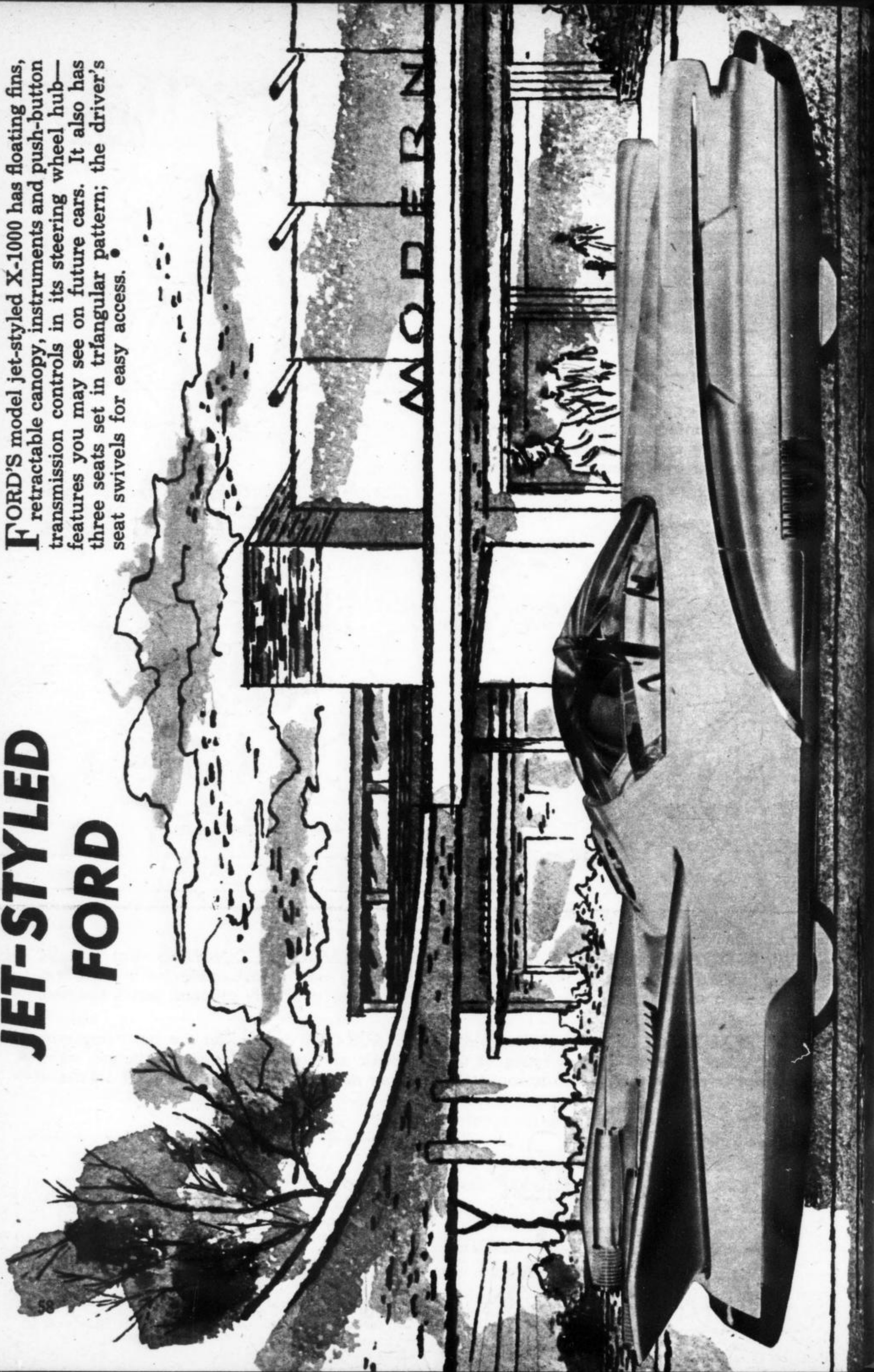
We could have an ion rocket proposed by Dr. Ernst [Continued on page 174]

"Aviation is on the threshold of amazing new concepts. Teams of scientists, researchers and engineers are already at work. Preliminary designs are on the drawing board. You may see the amazing triumph over the force of gravity in your lifetime!"



JET-STYLED FORD

FORD'S model jet-styled X-1000 has floating fins, retractable canopy, instruments and push-button transmission controls in its steering wheel hub—features you may see on future cars. It also has three seats set in triangular pattern; the driver's seat swivels for easy access.



A FAWCETT PUBLICATION

ST. PAUL, MINN.

PUBLISHED MONTHLY

MAY

APR 3 1944

NSC

10¢

MECHANIX ILLUSTRATED

(Reg. U.S. Pat. Off.)

Uncle Sam Wants YOU To
Build War Plane Models
Complete Scale Models - Page 35

4 MAGAZINES
IN ONE



The Navy's
NJ-1

HOW WE WILL CAPTURE TOKYO!

PRICE
10 CENTS

MECHANIX ILLUSTRATED

MAY
1942

Volume XXVIII
Number 1

W. H. FAWCETT, JR., President

Editors

Roland Cueva

Bill Williams

Associate Editors: George Daniels, Aviation; Norman C. Lipton, Photography; Charles D. Bonsted, News; Shirley Cutter, Production

Copyright 1942 by Fawcett Publications, Inc.

SPECIAL FEATURES

On the cover: the NJ-1, basic training ship in which Navy cadets learn practical blind flying. See page 87.

Build Models For The U. S. - - - - -	35
Two-Man Railroad - - - - -	39
The Commandos—20th Century Knights By Bruce Thomas, Foreign Correspondent	40
The Shivering Lens Camera - - - - -	44
This Plane Flies With No Propeller! - - - - - By George Daniels	46
How We Will Capture Tokyo - - - - - By Major Malcolm Wheeler-Nicholson, Military Expert	50
No Blackout For America - - - - - By S. G. Hibben, Westinghouse Director of Applied Lighting	54
Mechanics Plus Genius Equals Art - - - - - By Hoyt Barnett	57
Will We Come To This? - - - - -	61
Full Steam For America - - - - - By J. T. McTarnahan as told to George Daniels	62
Fly Your Models On A Wire! - - - - - By Bob Ruskauff	66
The Real Truth About Rubber - - - - - By Willis M. Kimball	69
Prescription Baseball Bats - - - - -	73
Guns That Guard Our Shores - - - - -	74
54 Pages Of Hobbies And How-To-Builds - - - - - starting on	93

(Continued on page 6)



BRUCE THOMAS

After 15 staid years as a West Coast writer, lecturer, and businessman, Bruce Thomas (author of the exciting account of "The Commandos—20th Century Knights" on page 40) returned last summer to salt-water sailing, at which he'd earned his way through school and college. Determined to observe conditions

in England at first-hand, he took his able-bodied seaman's license and lifeboat ticket from their frames, and shipped as an ordinary seaman again aboard a Dutch convoy ship bound from Nova Scotia to British Isles.

There he was accredited by the U. S. Embassy as a correspondent for the American magazines and newspapers he'd visited before leaving the United States, and got a 90-day stay. The British Ministry of Information gave him an office and enabled him to go on several "press tours," one of them a visit to a camp of the Commandos.

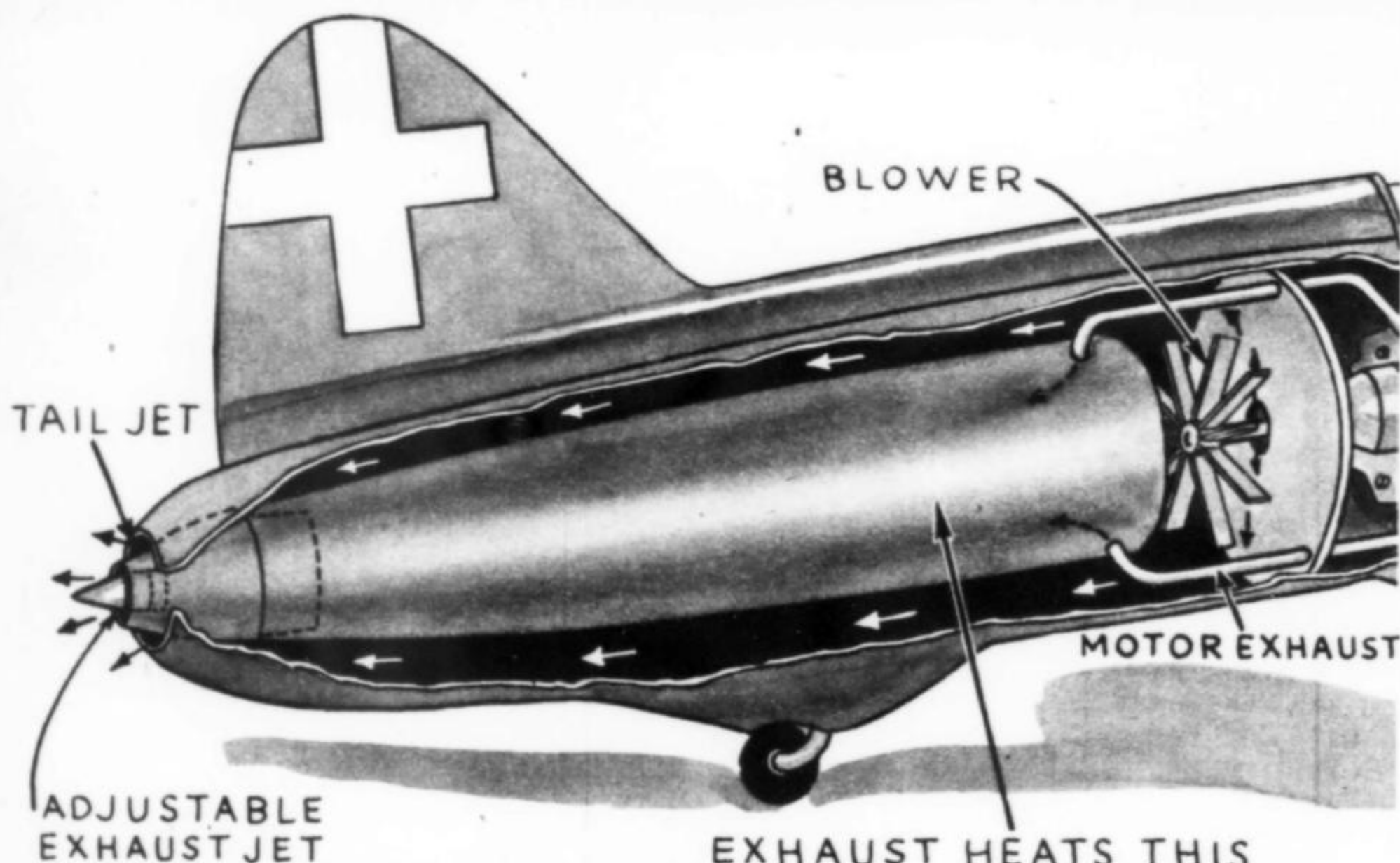
CAN TANKS FLY?

A coffin factory wouldn't seem a likely spot for one of the world's greatest aviation careers to begin, but that's where Vincent Burnelli first thought of designing planes. Since that time his giant airliners have hauled whole automobile showrooms into the sky, set amazing speed records, and startled the world. Today he plans to carry armored tanks in them! Read the story of this astounding designer in "Burnelli Did It First"—in the June MECHANIX ILLUSTRATED, out May 1.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1942 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 10c per copy. Subscription price \$1.00 per year in U. S. and possessions. Canadian subscriptions not accepted. Foreign subscriptions \$2.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

THIS PLANE FLIES



Air is drawn into C.C.-2 by blower somewhat like those in home oil burners. Internal cone is probably used to heat blower air, control exhaust. Artist's version above shows principle, not dimensions.

EXHAUST HEATS THIS SURFACE AND AIR UNDER PRESSURE FROM BLOWER

by George Daniels

Mechanix Illustrated Aviation Editor

AS SIGNOR SECONDO CAMPINI sketched out the design of his first jet propulsion monoplane, he may well have entertained a hopeful vision of vast propellerless bomber fleets hissing weirdly through the cirrus. Perhaps he chuckled to himself as he conjured up a mental picture of the ground below. The anti-aircraft batteries and the giant searchlight stations would still be waiting for their signal to go into action when the bombs had already begun to fall. Detector crews would rub their eyes and scan the heavens, vainly waiting for some faint sound in their earphones, but none would come until *after* the plans arrived!

Perhaps he fancied that Gianni Caproni's great Societa Italiana Caproni would reward him with a bonus—and maybe they will. It seems that he's really got something. His first attempt at jet propulsion was apparently hampered by a lack of confidence in the principle. The ship, designated as the C.C.-1, resorted to a conventional propeller for the

takeoff, and switched over to jet propulsion after it got in the air. It weighed nearly 4½ tons—but it's a shrimp compared to the 11,000-pound C.C.-2 which is now gathering laurels for itself and its designer.

The C.C.-2 has no propeller at all! And it actually flies!

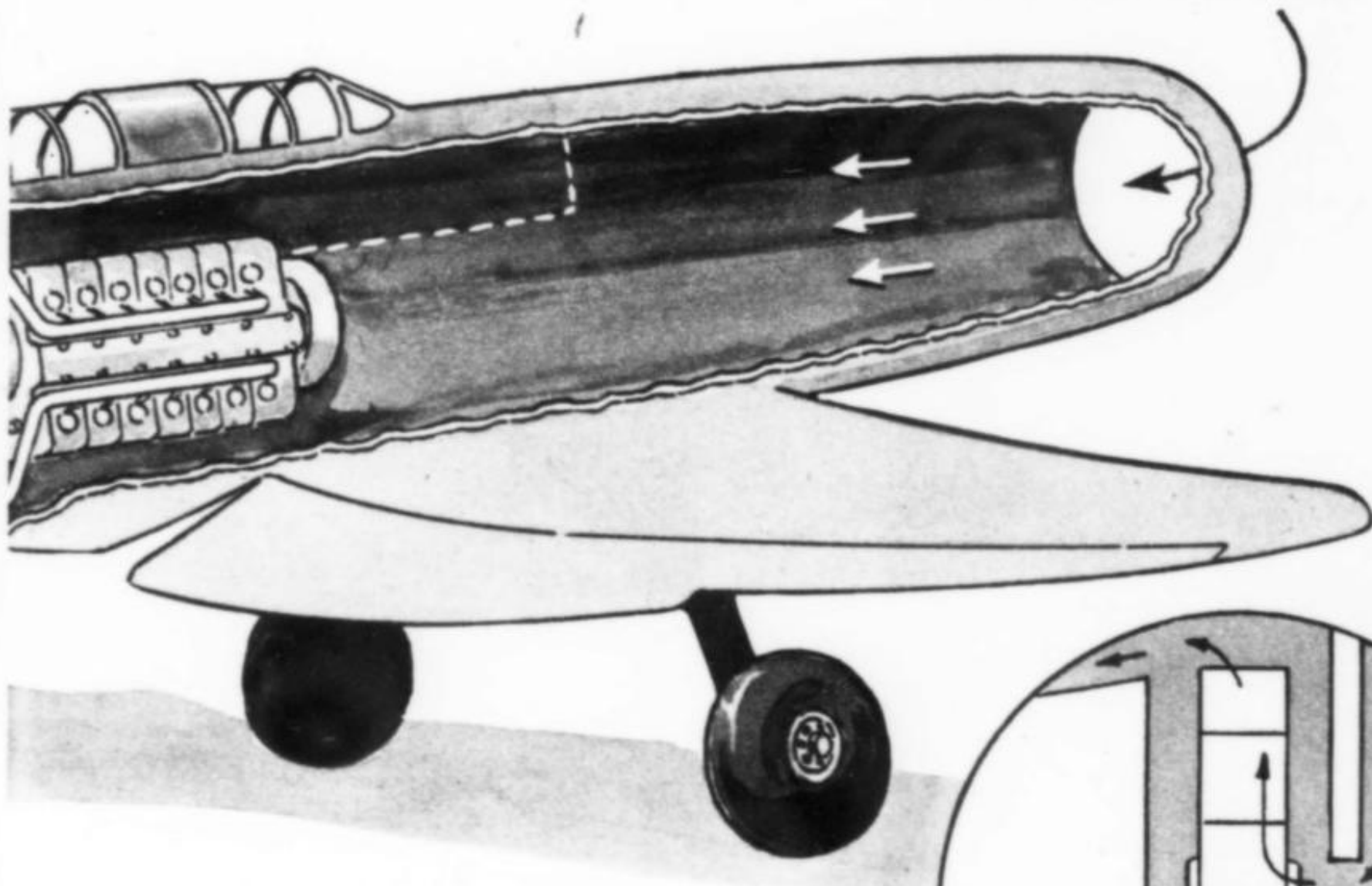
From all available information, Signor Campini, with an airplane that flies minus a propeller, has achieved the most revolutionary advance in aeronautics since the Wright brothers first took to the air!

The jet propulsion idea must have come easily to Signor Campini, as Italian scientists and experimenters have long been curiously fascinated by the idea of air blowing through a tube. Everyone has heard of a Venturi tube at one time or another. It's in the carburetors of our cars and our planes. But Campini may have gotten his idea from a Swiss scientist named Daniel Bernoulli. Way back in 1738 Bernoulli dreamed up an idea for running a boat by squirting water out of the stern. That,

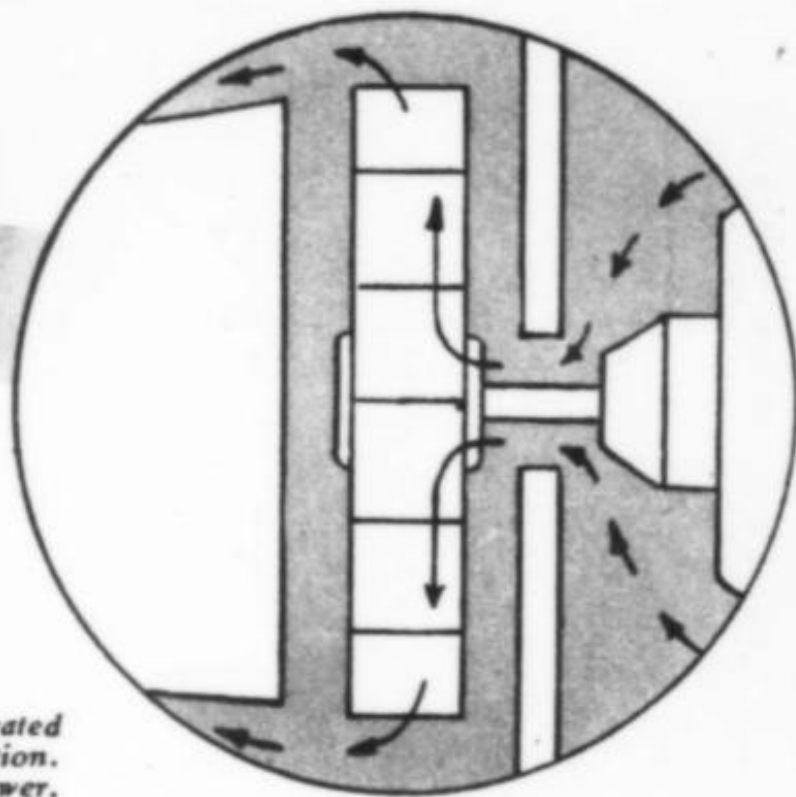
ES

WITH NO PROPELLER!

AIR ENTERS
NOSE OF PLANE

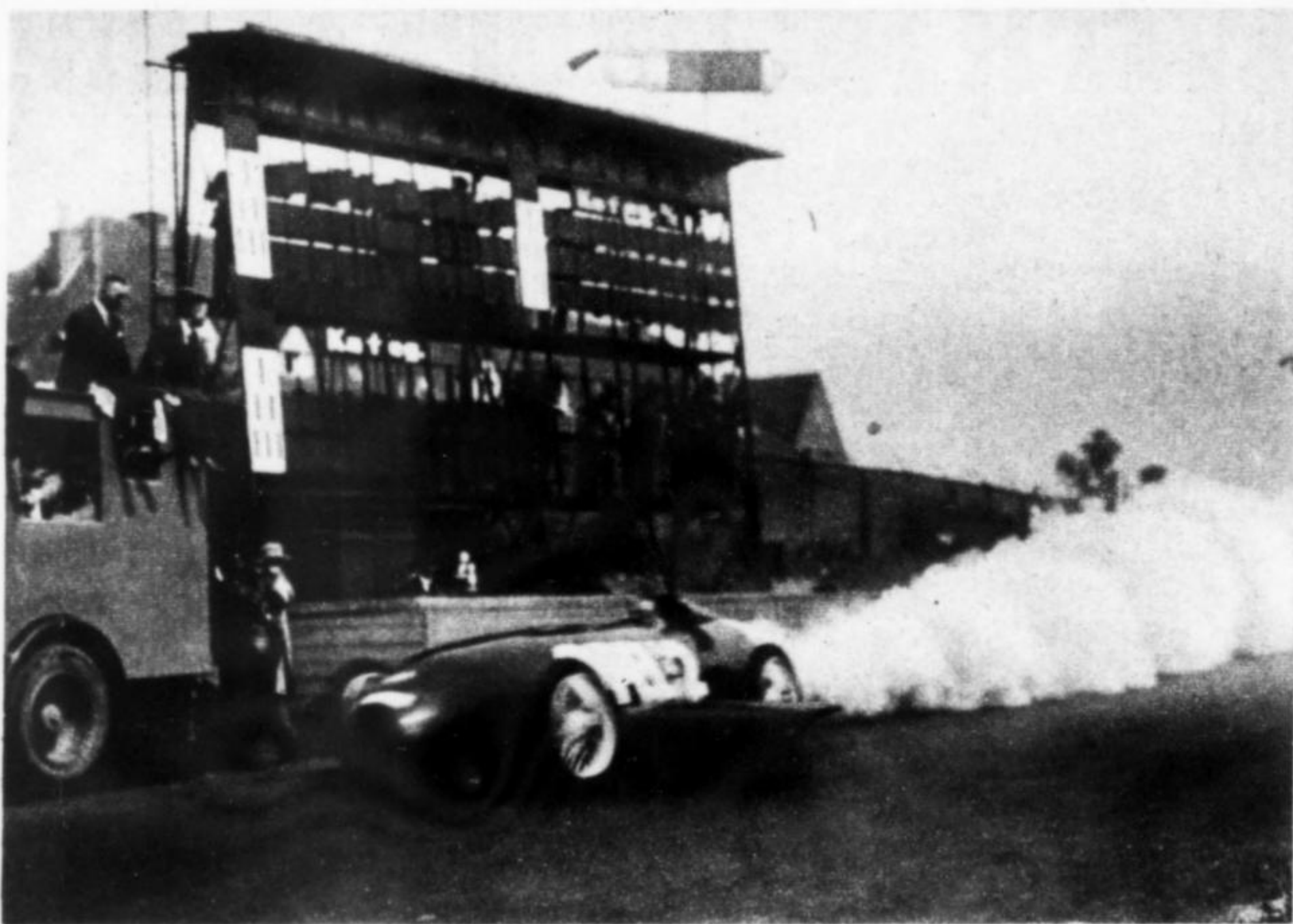


Today's propellerless Caproni-Campini C.C.-2, world's first engine driven rocket plane, is only a starter. A faster job will follow—perhaps as fast as sound!



Below: C.C.-2 in actual flight. To balance correctly, engine must be located forward. Sharp taper of wings and tail permit structural weight reduction. Right: Blower detail simplified. Engine cooler is undoubtedly aft of the blower.





A few seconds after a standing start Von Opel rocket race car was doing better than 100. Railroad version blew up at over 200.

perhaps, was the first jet propulsion plan. He didn't stop at that, however, but turned out a book full of theories—several of which are responsible for most of the major advances in aerodynamics up to now! When Campini calculated the characteristics of his wing section, the pressure in the air tube of his

plane, from nose to tail—and in the jet—he had to use Bernoulli's theories.

The C.C.-2 is really an engine-driven rocket plane. The air driven at high velocity from the tail jet drives the ship in the same manner as the hot gasses emitted from the combustion chamber in conventional rockets. The secret

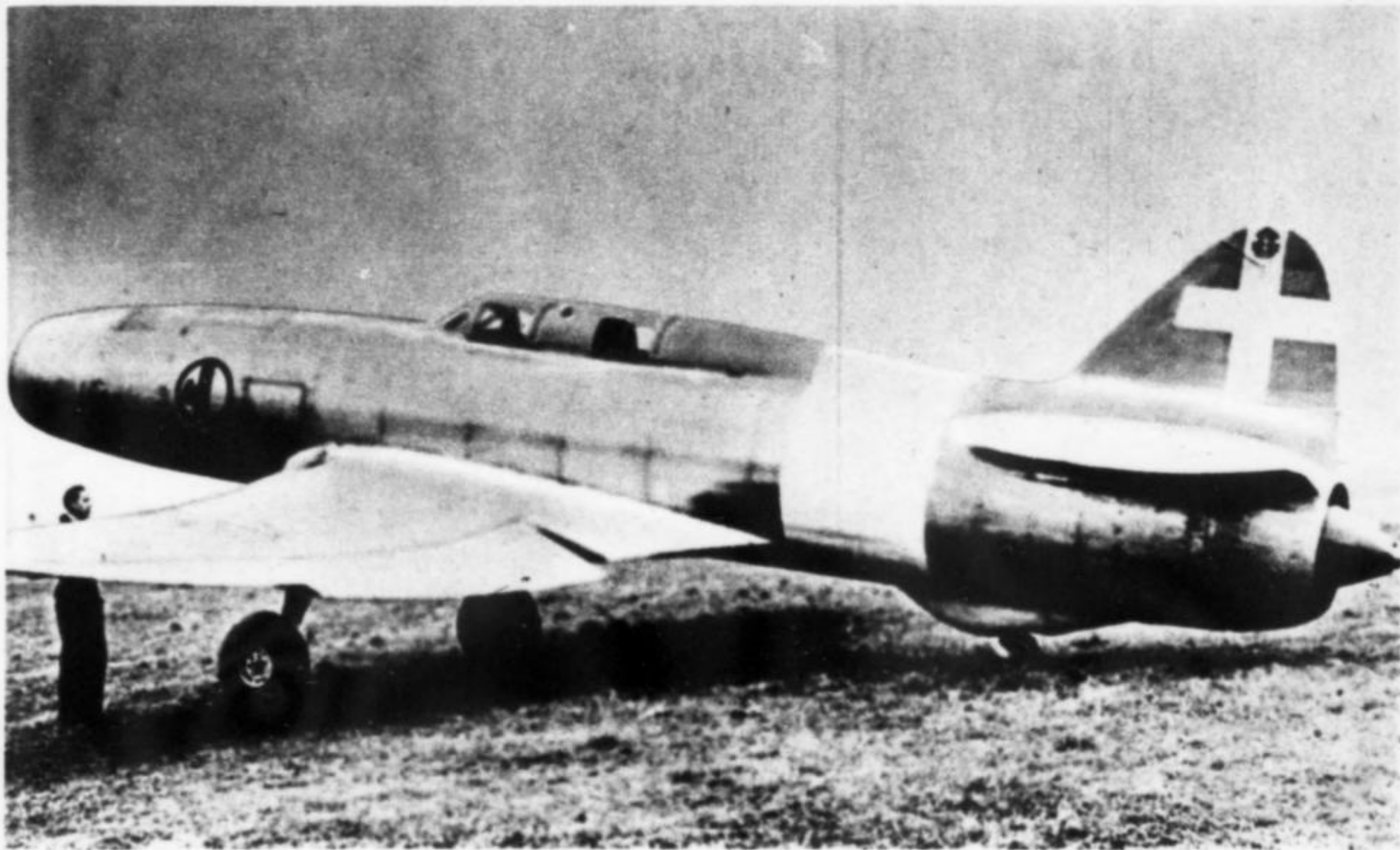
lies in forcing the air through the tail jet at an extremely high rate of speed. Newton's Third Law of Motion, "To every force there is an equal and opposite reaction," does the rest of the job. The high kinetic energy of the outrushing air causes a reaction which pushes the plane in the opposite direction—forward.

All this is much the same as the usual comparison between the "kick" of a gun and the

Herr Pietsch built this one. Spherical fuel tank affords greatest strength for high pressure fuels.

Mechanix Illustrated





Ground view of C.C.-2 shows adjustable tail jet cone to regulate jet propulsion air stream. Smaller cone valve can be seen at end of large cone. This undoubtedly jets exhaust independently. Cockpit is shallow so as not to interfere with flow. Additional impetus may be added by exploding special fuel charges in the central tube or near the tail jet.

flight of a rocket. It may seem surprising, however, that a mere rush of air could have a force comparable to the flaming blast of a skyrocket, but it has. And it's much quieter! If you want a demonstration of air-jet propulsion, simply blow up a toy balloon and then let go of it. The air rushing out of the neck of the balloon will send it darting all over the room. In other words, it becomes a little jet-propelled blimp—until the air's exhausted. It doesn't make much noise either.

That brings us back to the possibilities of Campini's machine. Engineers have known for quite a time that silencing the engine alone won't kill the noise of an airplane. The propeller makes plenty of racket all by itself. The sound of an electric fan will illustrate that point. Without the fan blades on the shaft, the fan's electric motor is practically noiseless. Well, the Signor has eliminated the propeller entirely. The exhaust becomes a steady tone, and then as the Campini idea is to outrun sound, future planes would arrive before their own noise anyway. The noise is reported to be a healthy hiss, rising to shriek proportions only during the takeoff. An early experimental model was described as "sounding like a sulking cat—part hum and part hiss."

The blower that drives the air through this strange ship is very much like the one in a domestic oil burner. It's not unlike a super-

paddle wheel. When it turns at high speed the centrifugal force throws the air outward toward the rim, creating a lower pressure or partial vacuum at the center. Air rushes in through an aperture around the shaft, to fill the partly evacuated area. The air that is "hurled" out toward the rim is deflected back through the hollow fuselage, being heated en route by the hot exhaust gasses. A central duct is probably used as a combination exhaust expansion chamber and air heater. Although the Italians have implied that the exhaust is released directly into the blower-driven air inside the fuselage, they offer no explanation for the as yet unmentioned secondary jet in the tail. This jet (plainly visible in photos) is located near the apex of the conical main jet regulator valve. Its purpose may very likely be the independent control of exhaust back pressure. Designer Campini and Boss Caproni have undoubtedly copied the Northrop technique by building a "flying mockup" designed to permit a maximum number of changes with a minimum of time and labor.

The engine itself is designed for high r.p.m., as a centrifugal blower of the type employed becomes efficient only at higher speeds. Engine cooling, of course, offers no problem in the C.C.-2. With the powerplant close-

[Continued on page 160]

GUNS THAT GUARD OUR SHORES



16-inch gun.



81- and 60-millimeter mortars.



37-millimeter anti-tank gun.



37 mm. anti-aircraft.



75 mm. howitzer.



75 mm. gun.



90 mm. anti-aircraft.



105 mm. howitzer.



155 mm. howitzer.



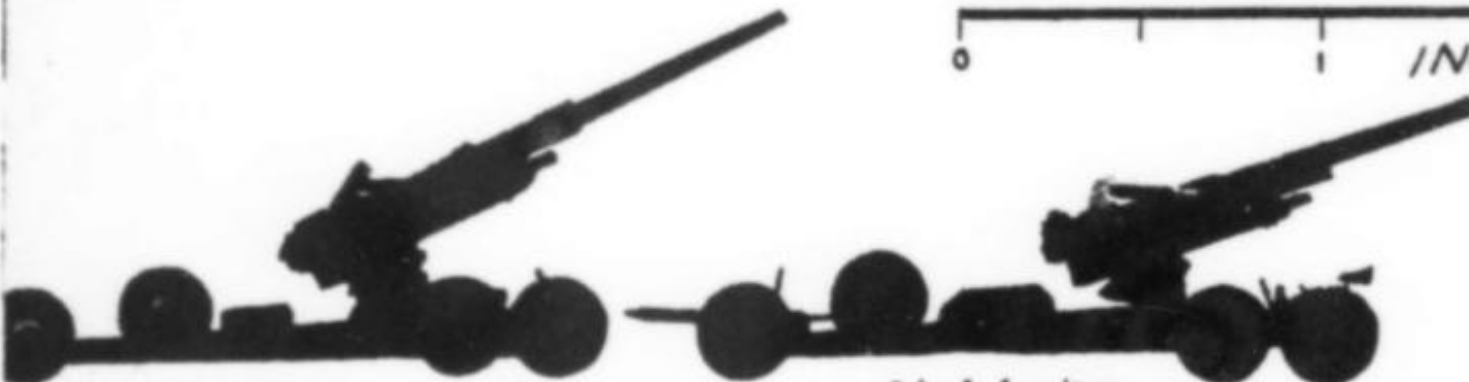
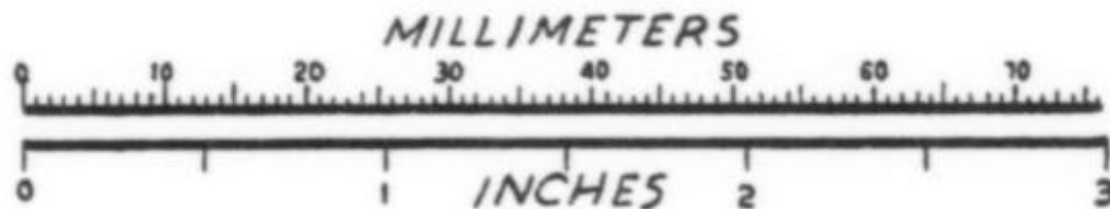
12-inch mortar.



240 mm. howitzer.



3-inch anti-aircraft.



155 mm. gun.

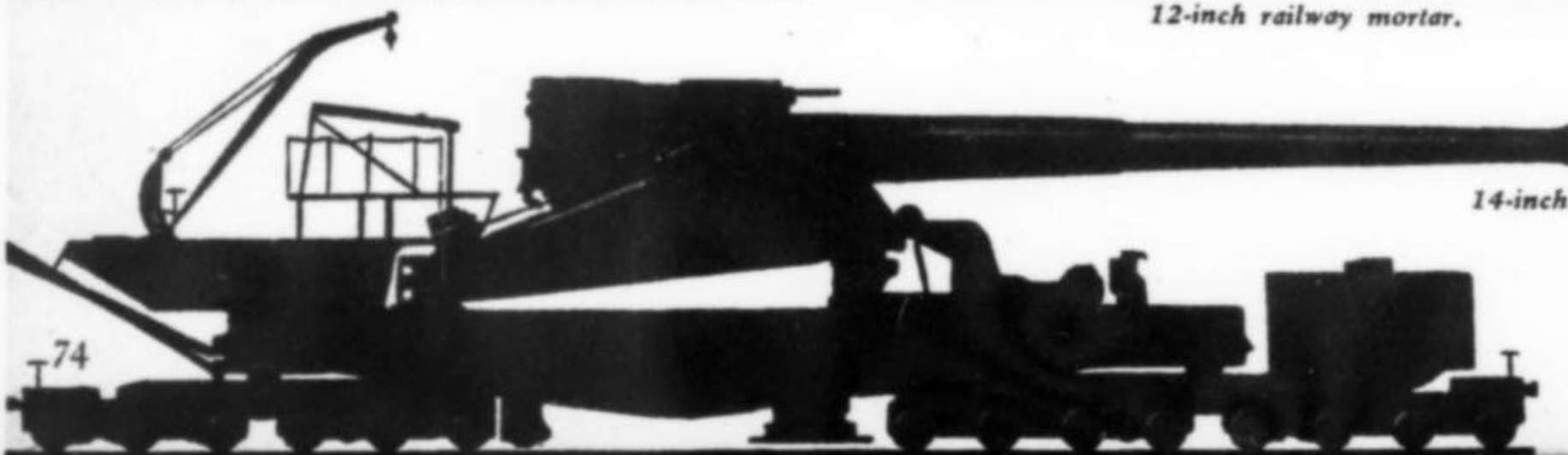
8-inch howitzer.

Drawn to accurate scale, silhouettes on this page show comparative sizes of principal U. S. guns. Scale above shows the relationship between "millimeters" and "inches" in measuring the diameter of the bore of a gun. One inch approximates 25 millimeters.

8-inch railway gun.



12-inch railway mortar.



14-inch railway gun.



16-inch coast defense guns will throw a 2,300-pound shell up to 28 miles, costs \$50,000 to make and costs \$2,500 to fire.

ON FOUR pages, we present here the principal types of guns that are now guarding the shores of America against invaders. From the tiny 60-millimeter mortar to the giant 16-inch coastal rifle, these guns are shown in picture and diagram. On the opposite page you will find a scale relating "inches" and "millimeters."

A FAWCETT PUBLICATION

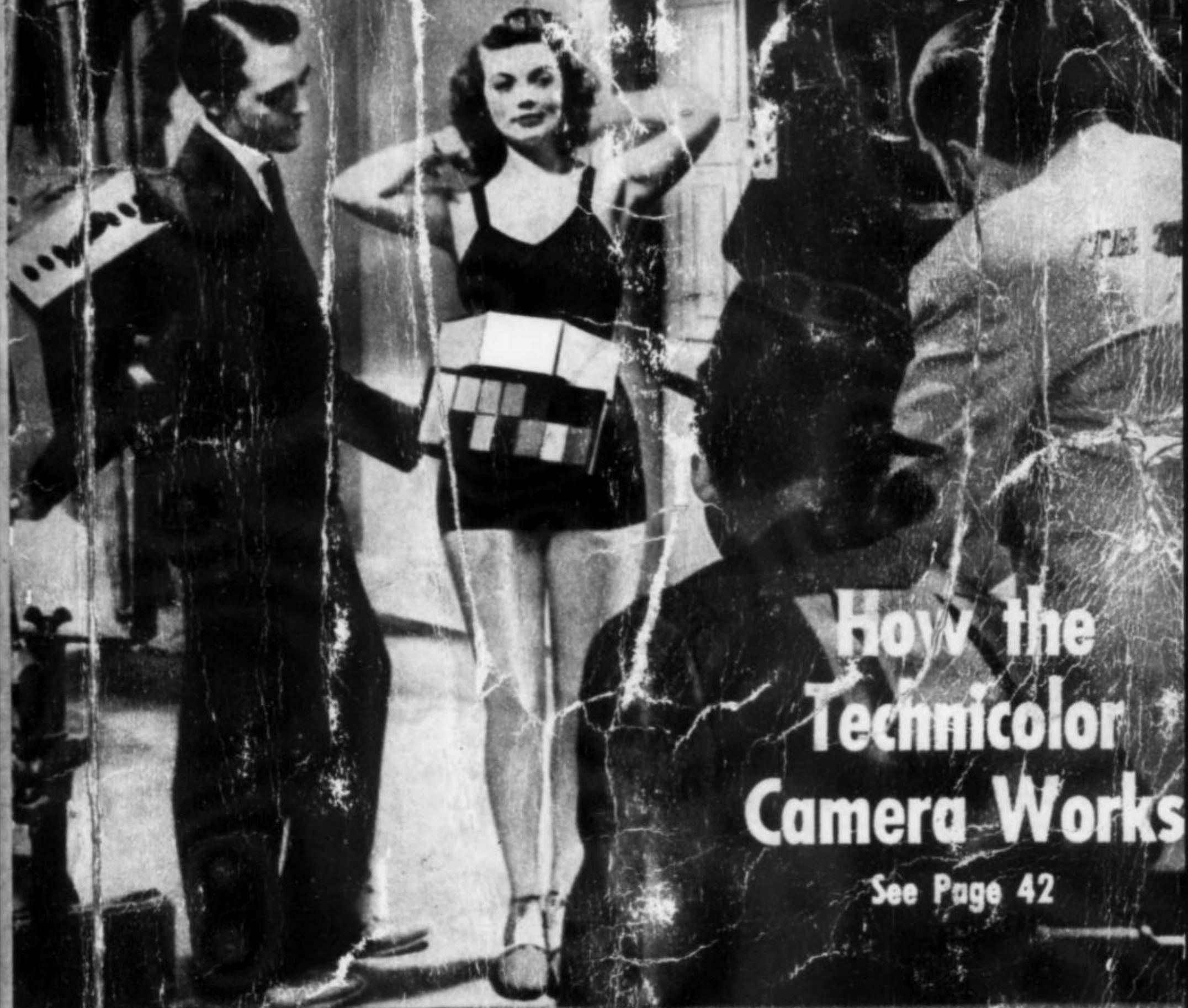
Baden Branch **MARCH**

3216 N. Broadway **193**

Reg. U.S. Pat. Off.

MECHANIX ILLUSTRATED

now **10**



How the
Technicolor
Camera Works

See Page 42

THIS MAGAZINE GUARANTEED!

Satisfaction or Double Your Money Back • See Page 58

PRICE
10 CENTS

SAME PRICE
IN CANADA

MECHANIX ILLUSTRATED

MARCH
1939

Volume XXI
Number 5

Copyright 1939 by Fawcett Publications, Inc.

SPECIAL FEATURES

I Flew Foreign War Planes - - - - - 35

By Major Al Williams

How The Technicolor Camera Works - - - 42

Inventor's Gold! - - - - - 44

By Stanley Gerstin

Tomorrow's Man-Of-War - - - - - 47

Winners In The "Men With Wings" Contest - - 50

First Steam-Electric "Iron Horse" Speeds Over

Rails At 125 M. P. H. - - - - - 53

Britain's New Air Giant - - - - - 56

Mechanics In Dentistry - - - - - 63

So You're Buying A Boat! - - - - - 70

By Roland Cueva

(Continued on page 6)

AIR RAID!

London, Paris, Berlin, Rome, New York, Tokio, Moscow—these are the nerve centers of the world! These are the proud cities of today destined to be mere heaps of smoldering ruins when monster bombers raid them tomorrow. Is there a defense against flying fortresses and long-range bombers? Can foreign war planes really penetrate military defenses and devastate populous areas?

Major Al Williams will answer this question for you in the second of his series of articles which will appear in the April issue of MECHANIX ILLUSTRATED.

"There's precious little defense," says Major Williams, "against a determined air attack. You can't hide from war planes dropping deadly 2,000-pound bombs."

If you have an idea that non-combatants will be safe in the next war, read Major Williams' story—you are due for a rude awakening.

PHOTOGRAPHY

Winners Of Photo Awards - 79

Close-Up Pictures With Copy

Lens - - - - - 80

Paper Cutting Guide - - - 81

Kinks For Camera Fans - - 82

Amateur Photo Puzzlers - - 84

Published monthly by Fawcett Publications, Inc., 11th Street and Broadway, Louisville, Kentucky. Executive Office—22 W. Putnam Avenue, Greenwich, Connecticut. Editorial and Advertising offices—1501 Broadway, New York, New York. Send subscriptions to the Louisville, Kentucky, or Greenwich, Connecticut, addresses.

Entered as second-class matter under the Act of March 3, 1879, at the post office in Louisville, Ky., with additional entry at Greenwich, Conn. Not responsible for unsolicited manuscripts. In U. S. and Possessions and in Canada, 10c a copy; \$1.00 a year. Other Postal Unions, \$2.00 a year. East Indian Agent, P. C. Eraneer Sons, Bombay, India. Printed in U. S. A. Advertising forms close the first of second month preceding date of issue. Advertising offices: New York, 1501 Broadway; Chicago, 360 N. Michigan Ave.; San Francisco, Simpson-Reilly, 1011 Russ Bldg.; Los Angeles, Simpson-Reilly, Garfield Bldg. Member Audit Bureau of Circulation.

W. H. FAWCETT, Publisher RALPH DAIGH, Managing Editor ROBERT HERTZBERG, Editor AL ALLARD, Art Director
JOHN L. SCHERER, STANLEY GERSTIN, ROLAND CUEVA, Associate Editors S. S. RABL, Naval Consultant



SPOTTING PLANES WILL
REPLACE THE PRESENT
LOFTY FIRING CONTROL
STATION

TOMORROW'S MAN-OF-WAR



ESTIMATED
COST OF NEW
BATTLESHIP

FULLY PROTECTED
SMOKE STACK,
VENTILATORS,
ETC. TO LESSEN
DANGERS OF
AIR ATTACK

4 PLANES
CARRIED IN
BOARD FOR
SERVICE AS
"SPOTTERS"

BRIDGE

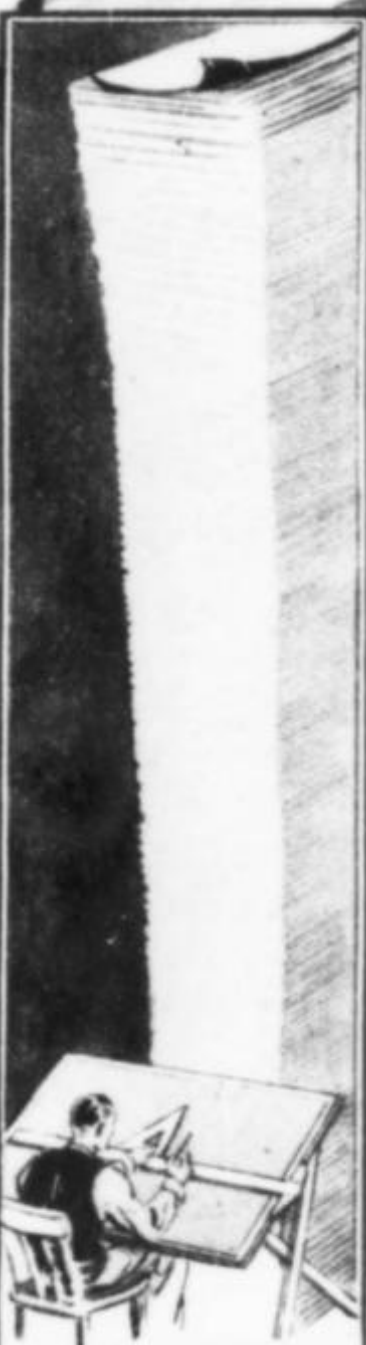
DISPLACEMENT
OR TONNAGE

45,000
TONS OF
WATER

REPRESENTATIVE PRESENT
DAY WARSHIP DEPICTED
ABOVE IS DRAWN IN
SAME APPROXIMATE
SCALE. NOTE THE
ALREADY EXISTING
TENDENCY TO
ELIMINATE
THE SUPER-
STRUCTURE

DOUGLAS
ROLFE

A COMPOSITE picture of the 100-million-dollar, 45,000-ton battleship urged by President Roosevelt, is shown here by our artist, Douglas Rolfe. If built, the super-dreadnought will be 750 ft. long, 108 ft. wide, top speed will be 25 knots, it will have 12 16-in. guns or 9 18-in. guns, and 60,000 h.p. It will carry anti-aircraft guns, combat planes and a spotting plane to direct gun fire.



15,000 BLUEPRINTS
WILL BE REQUIRED
TO COMPLETE THE
WARSHIP'S DESIGN!



HORSEPOWER — EACH COMPLETE SYMBOL REPRESENTS 10,000 HORSEPOWER (OIL-STEAM TURBINES)



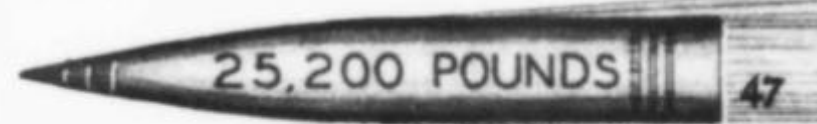
SPEED — 25 KNOTS, APPROX. 29 MILES PER HOUR



MAIN OFFENSIVE ARMAMENT — EACH SYMBOL REPRESENTS THREE 18-INCH GUNS OR FOUR 16-IN. GUNS IF THE SMALLER CALIBER IS DECIDED BEST



MAIN DEFENSIVE ARMAMENT — EACH SYMBOL REPRESENTS FOUR 5-INCH COMBINATION GUNS FOR ANTI-AIRCRAFT AND ANTI-TORPEDO PURPOSES

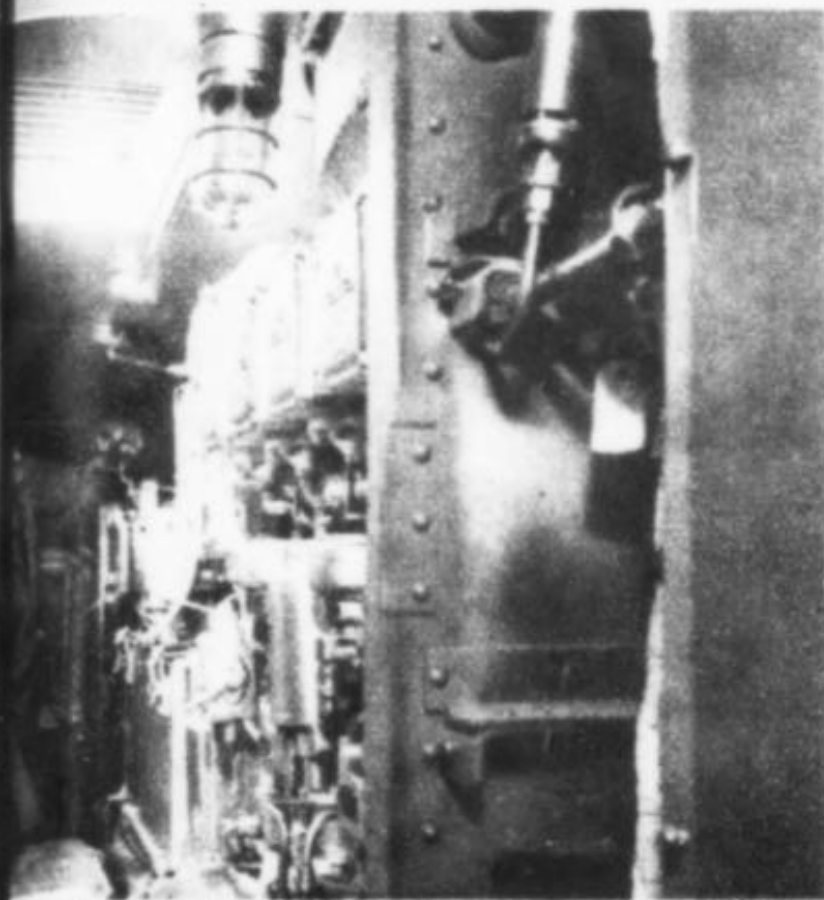


25,200 POUNDS

47

PROJECTILE WEIGHT OF A FULL BROADSIDE

First Steam-Electric "Iron Horse" Speeds Over Rails at 125 M. P. H.



Comfortably seated before the controls (right), the engineer of the new 5000 H.P. steam-electric locomotive has a clear view of track ahead through a wide window.



Left — Interior view of the nose of the engine cab showing the controls which automatically regulate the supply of fuel fed to the steam boilers.

The two units, which make up the complete two-cab locomotive (below), each weigh 265 tons and are 90 feet long. Electrical braking insures short, but smooth, stops.



FEATUREING a top speed of 125 m.p.h., a new type of streamlined electric locomotive, which uses a steam turbine plant to generate current for its six driving motors, was demonstrated for the first time before a party of railroad men, officials of the company which built it and newspapermen at Erie, Pa., recently. Though neither turbines nor turbo-electric drive in itself is particularly new, it is the first time that either has been successfully applied to railroad purposes.

The new locomotive is as efficient as conventional locomotives and able to travel three times as far

(500-700 miles) without stopping for fuel or water, the 5,000-horsepower giant was designed and built by the General Electric Company for the Union Pacific Railroad. It will be put through a series of exhaustive operating tests before being placed in scheduled service.

Because it has a steam turbine, burning the fuel oil in a fire box instead of in an internal combustion engine, the new "iron horse" operates on a low grade of "bunker oil," which is cheaper than the type of oil required in diesel engines.

A FAWCETT PUBLICATION

MECHANIX

JULY

NSC

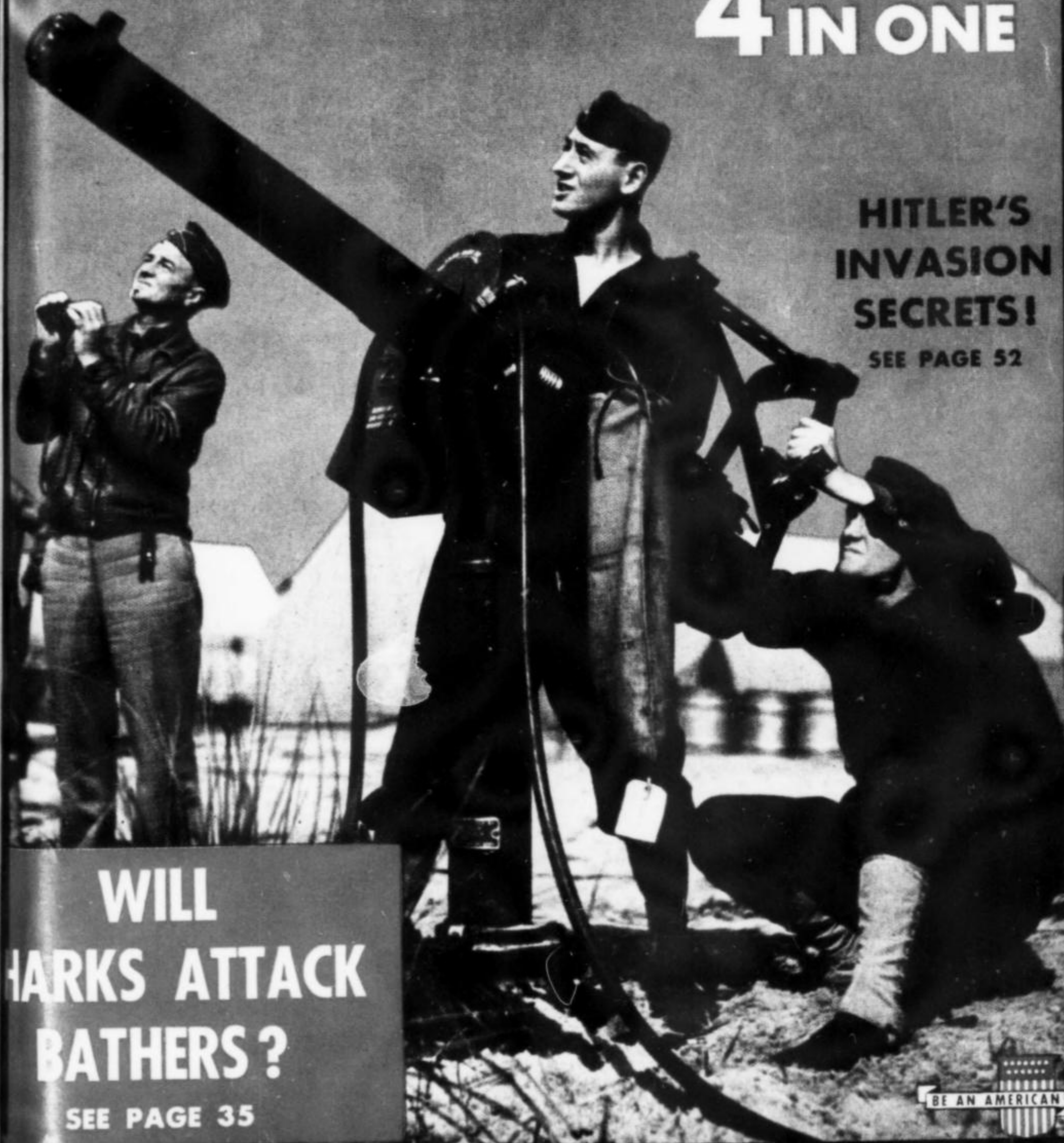
ILLUSTRATED

Reg. U.S. Pat. Off.

4 MAGAZINES
IN ONE

HITLER'S
INVASION
SECRETS!

SEE PAGE 52



WILL
HARKS ATTACK
BATHERS?

SEE PAGE 35

BE AN AMERICAN

PRICE
10 CENTS

MECHANIX ILLUSTRATED

JULY
1941

Volume XXVI
Number 3

W. H. FAWCETT, JR., President

Copyright 1941 by Fawcett Publications, Inc.

SPECIAL FEATURES

Man—Meat For The Shark!	34
<i>By Lieut. Horace S. Mazet, F.R.G.S.</i>	
You're Wanted—For A Defense Job!	40
<i>By Donald G. Cooley</i>	
Titan Of The Tow Trucks!	44
<i>By John T. Lynch</i>	
Heartbreaks Of The Air!	48
<i>By George Daniels, Aviation Editor</i>	
Hitler's Invasion Secrets!	52
Cutting In On A Fortune!	54
<i>By Lester David</i>	
Houses While You Wait!	58
Hollywood—Scientific Ghost Town!	59
<i>By Andrew R. Boone</i>	
Wanna Fool A Duck?	63
Bel Geddes, Master Showman!	64
<i>By Cliff Taylor</i>	
MI PRIZE CONTEST WINNERS	68
This Way, Please!	70
<i>By Ronald Banks</i>	

(Continued on page 6)



DONALD
G. COOLEY

Don Cooley, whose article, "You're Wanted—For A Defense Job!" appears on page 40, will be remembered by readers of MECHANIX ILLUSTRATED for his highly authentic and informative series of articles on "Your Job," which appeared last year. Don

started his career writing detective and adventure stories, and then found a happy outlet for a lifelong interest in science when MECHANIX ILLUSTRATED (then MODERN MECHANIX) was being organized. After five years at the editorial helm, he became curious to know if several South Sea novelettes he had written were authentic as to background, so he spent a summer in Tahiti and returned to New York to become a free-lance writer. In recent years he has been writing mostly on scientific and medical subjects, since he believes that the most fascinating of today's developments are taking place in those fields.

Fly your own airplane the first time you ever leave the ground!

It sounds incredible. But Maxwell Hamilton, writer for MECHANIX ILLUSTRATED, actually did it!

Mr. Hamilton was one of those rare birds, a man who in this day and age had never been up in an airplane, even as a passenger! He took his first ride just the other day, out at New York's Roosevelt Field. He stepped into an airplane, took over the controls, taxied across the field, and made a perfect takeoff! He flew the plane around for an hour—and then brought it in himself to a satisfactory landing!

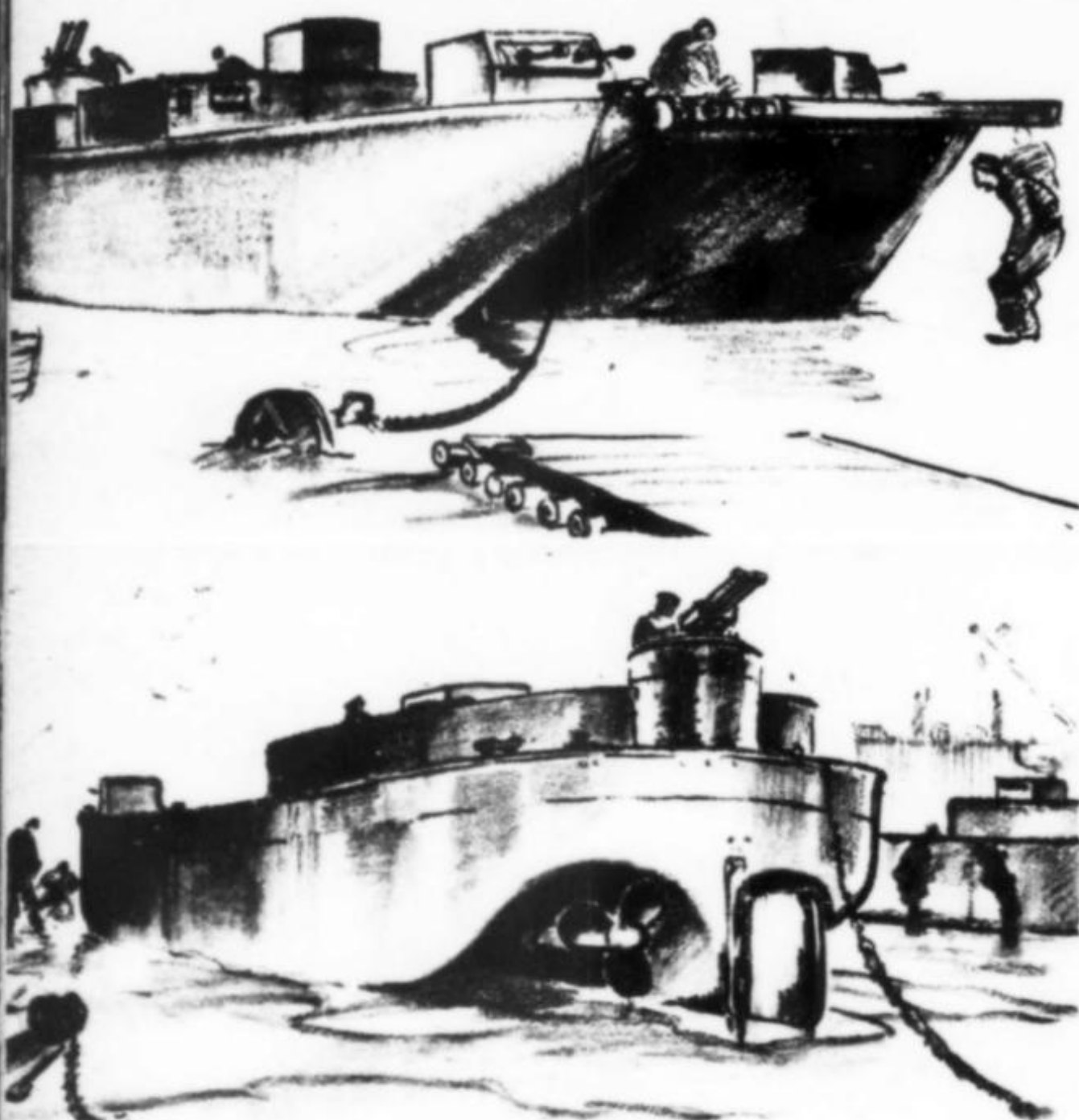
There's no catch. It was simply a miraculous new type of airplane which, believe it or not, is spin-proof. Mr. Hamilton tells about it in September MECHANIX ILLUSTRATED.

ROBERT HERTZBERG, Editor

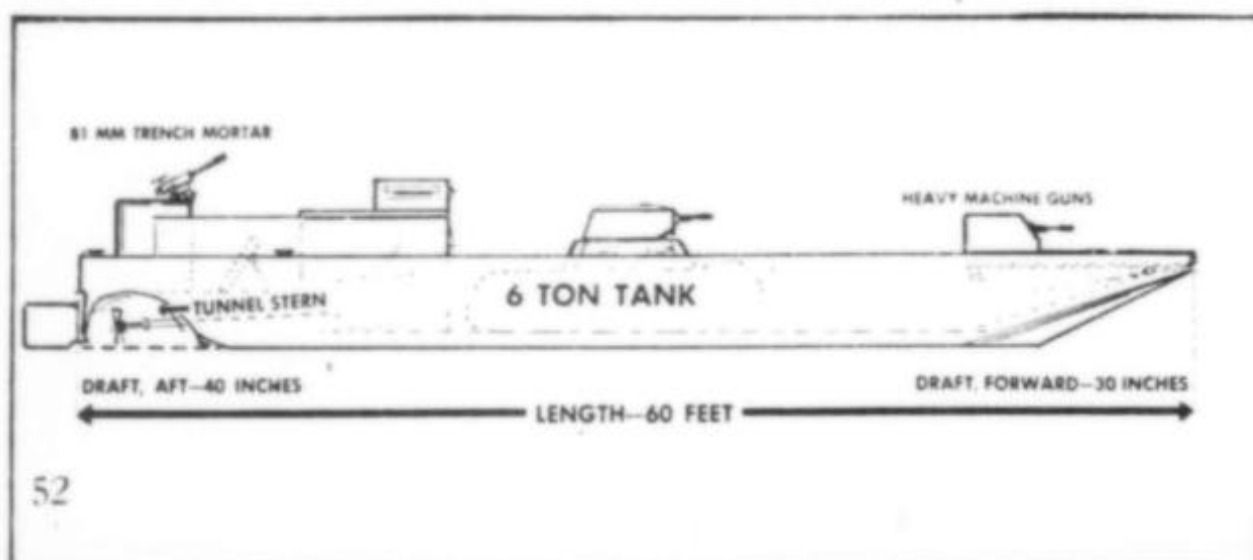
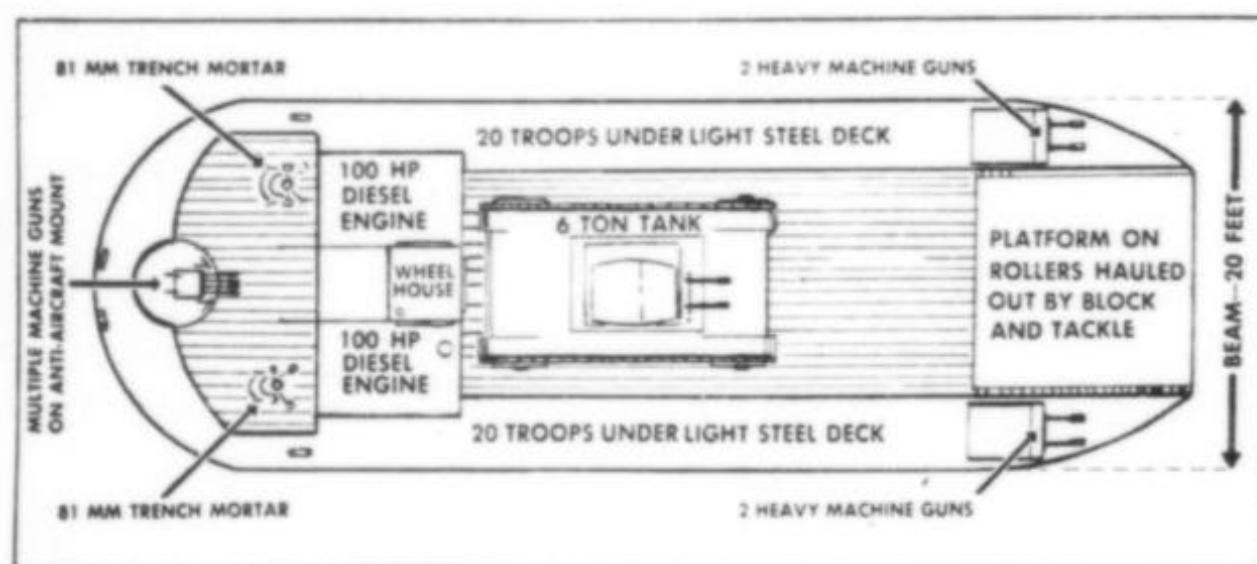
MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1941 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 10c per copy. Subscription price \$1.00 per year in U. S. and possessions. Canadian subscriptions not accepted. Foreign subscriptions \$2.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

Hitler's Invasion Secrets!



The two pictures above show how the proposed invasion barges will appear, fore and aft. The two propellers may be recessed into the hull so they won't scrape the bottom when the barge is run up on the beach. Two propellers are necessary so the barges can be steered by slowing up one and speeding up the other if the rudder should be damaged.



SINCE the fall of France last Spring, the world has been asking itself one question: If and when Hitler attempts to invade England, how will he do it—or try to do it?

Invasion weather is here. If the Nazis intend to make good their threats, they must invade England between now and August or give up the idea. By this time next year, American aid will have helped make England's defenses entirely too formidable for any such invasion attempt.

Should the Germans try invasion, they'll probably attempt it at night in fleets of great barges, augmented by shoal-draft freighters, of which Germany has thousands. Destroyers and submarines will guard the invasion fleet across the Channel, and an overhead blanket of fighter planes and bombers will protect them during the crossing and while they are attempting to establish a landing base.

No one knows exactly what the barges will look like, how fast they will travel or how many men and tanks they will carry. Varied naval and military opinion pictures them as resembling everything from speedy sea-sleds to clumsy scows towed by tugs or destroyers.

Jack Coggins, well-known marine artist who has drawn the sketches and diagrams on these pages, bases his drawings on an extensive knowledge of functional ship design, combined with a thorough familiarity with the Channel

The two diagrams at the left give an overhead and profile view of the invasion barges. Note the very simple construction.

Mechanix Illustrated



Here is the actual invasion, as envisioned by Jack Coggins. The troops landing in the rubber boat are from the Rhine River freighter in the background. The whole invasion would be covered by an overhead blanket of Nazi planes.

Coast of England. Before making these drawings, he imagined himself in Hitler's place. If he were going to invade England, he thought, he'd have to be able to transport and land wave after wave of troops. On his ability to do this the success of an invasion would depend.

He realized that he would have to transport these troops across the Channel in boats that could be run up on a beach. Unloading men on small boats from freighters, cruisers or destroyers would take too long. He realized, also, that the troops would have to be preceded by tanks, and that he would have to land light artillery and machine guns on the beach to back up the landing forces.

Hundreds of barges would be needed for such an invasion, which means that they must be simply and cheaply made. They must be shallow-bottomed so they can be easily beached, and they must have room for at least one light tank, with some sort of runway up forward to roll it onto the shore.

To avoid the dangers of wallowing helplessly if their towing ships were crippled, the barges would be self-propelled. They would be sufficiently armed to defend themselves against fighter planes and bombers, but not armed heavily enough to slow them down too much.

Taking all these things into consideration, Jack Coggins designed the invasion barge which appears on these pages. It is 60 feet long, 20 feet wide and made of light steel. It is flat-bottomed and very shallow, drawing 40 inches of water aft and 30 inches forward. It displaces around 85 tons. The invasion barge wouldn't be any bigger than this, Coggins reasons, because any larger ship would be less maneuverable, less likely to slip through the coastal defense traps that will be awaiting it.

The forward two-thirds of the barge is a hollow shell. Steel shelves curve inward to make protective side decks under which

[Continued on page 142]

A FAWCETT PUBLICATION

10¢ MECHANIX ILLUSTRATED

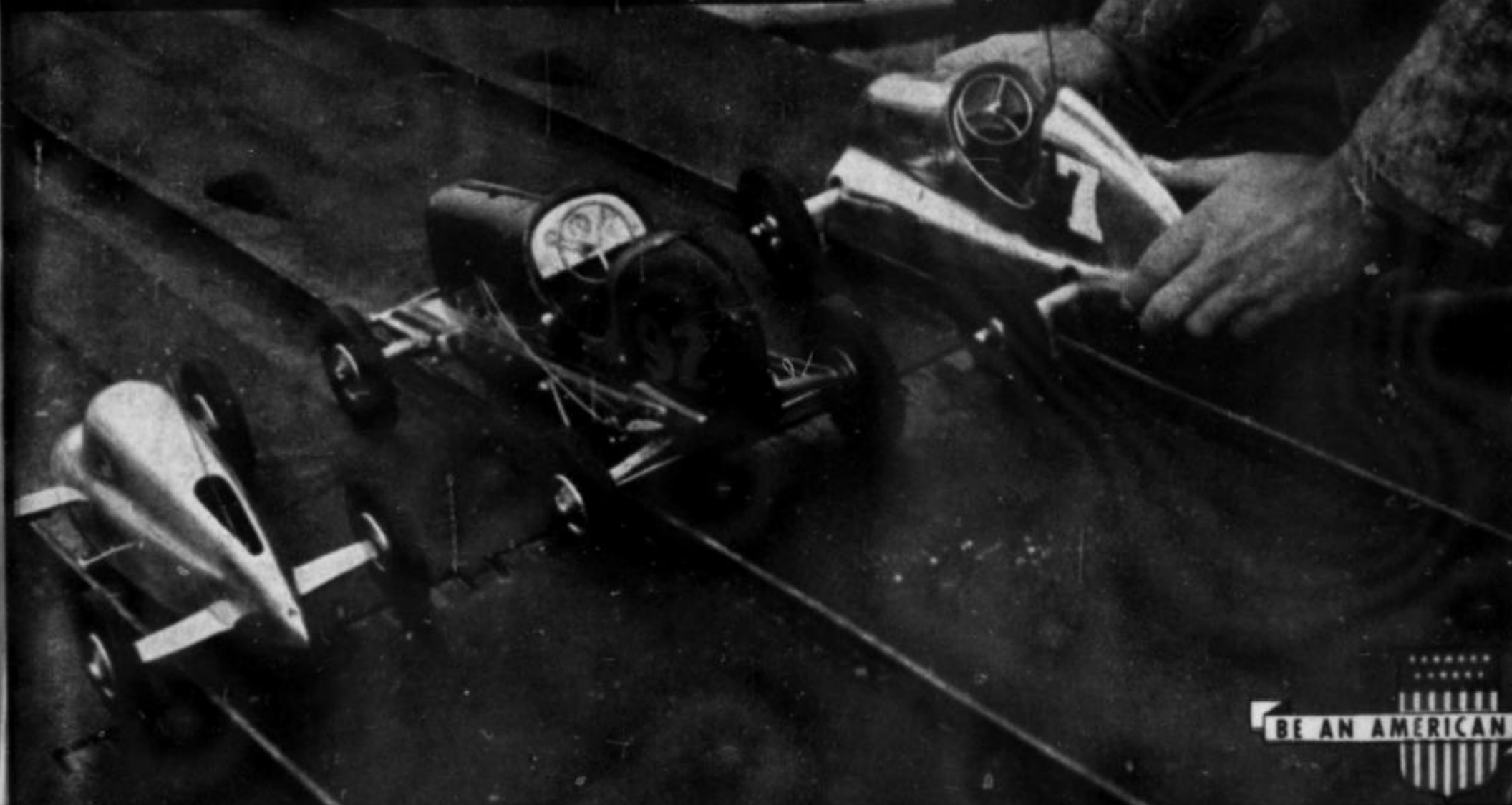
ST. PAUL
MAY
NSC
APR 3 1941

Reg. U.S. Pat. Off.

Now
**4 MAGAZINES
IN ONE**

SPINDIZZIES!

100 m.p.h. With Model
Cars on Banked Track



BE AN AMERICAN

PRICE
10 CENTS

MECHANIX ILLUSTRATED

MAY
1941

Volume XXVI
Number 1

W. H. FAWCETT, JR., President

Copyright 1941 by Fawcett Publications, Inc.

SPECIAL FEATURES

Spindizzies—100 M.P.H. or Bust! - - - - -	35
<i>By John Q. Copeland</i>	
A Ship Is Launched! - - - - -	40
<i>By Lester David</i>	
Paradise For Sunday Drivers! - - - - -	44
<i>By Bob Ruskauff</i>	
"The Following Is Transcribed—" - - - - -	48
<i>By Ronald Banks</i>	
Blasting The Bombers! - - - - -	52
<i>By Douglas Rolfe</i>	
Water On The Brain! - - - - -	56
This May Be Our Greatest Weapon! - - - - -	59
Dollar A Day Holiday! - - - - -	60
America Beats Off An Air Raid! - - - - -	64
<i>By Cliff Taylor</i>	
Tune Up Your Car The Modern Way - - - - -	70
<i>By Fred C. Russell</i>	

(Continued on page 6)



DOUGLAS ROLFE

Douglas Rolfe, whose illustrated article, "Blasting the Bombers!" appears on page 52, has been a contributor to MECHANIX ILLUSTRATED for 12 years. Born in London, England, Doug was visiting in Germany at the outbreak of World War No. 1. Arrested, he spent several months in German prisons before escaping to Switzerland. He returned to England, joined the British Army and spent the next four years in various branches of service, emerging at the time of the Armistice as a 2nd Lieutenant in the Royal Air Force. Coming to the United States in 1919, he barnstormed around the country for a few years before being grounded by a bad crack-up. He turned to various occupations, finally lighted on art, and has been at it ever since. Acknowledged as one of the outstanding aviation artists of the country, his imaginative drawings have drawn constant praise from our readers.

From the way entries are pouring in with every mail we have the feeling, as we go to press, that every reader and his brother has taken a shot at winning the MI Prize Contest!

The prize winners will be announced in the earliest issue possible—keep your eyes peeled for it, as you may be a winner of one of those great prizes!

The new MECHANIX ILLUSTRATED is on sale at all newsstands the first of every month.

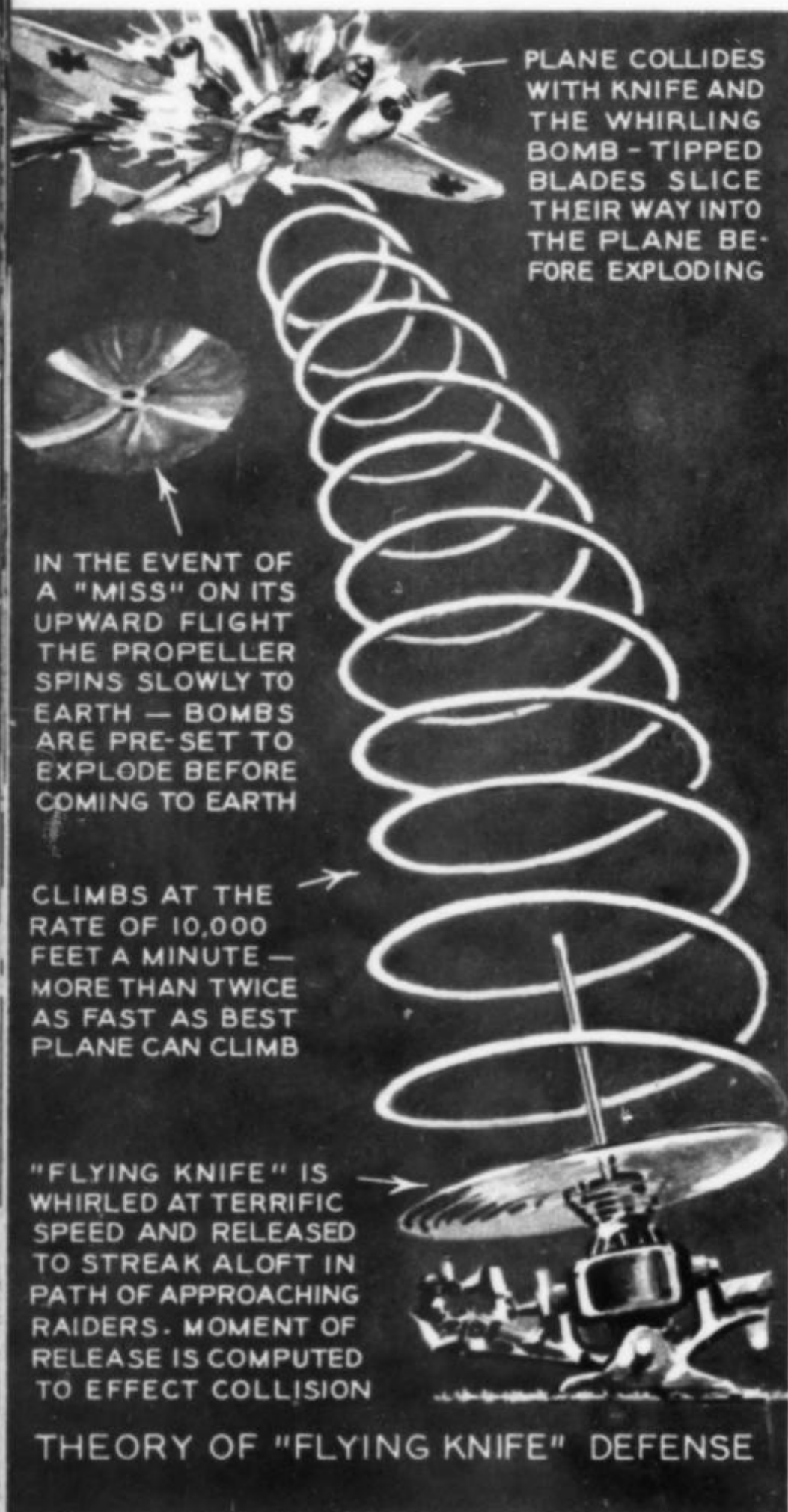
ROBERT HERTZBERG, Editor

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1941 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 10c per copy. Subscription price \$1.00 per year in U. S. and possessions. Canadian subscriptions not accepted. Foreign subscriptions \$2.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

BLASTING The BOMBERS!

by Douglas Rolfe



RELOADING THE AUTO-PROJECTOR GUN



A "BLIND" weapon that may appear shortly as an aid in combating the night air-raider is the explosive momentum-climb propeller, or auto-projector. Churning the air into a roaring column, this deadly bomb-tipped device could streak aloft at 10,000 feet

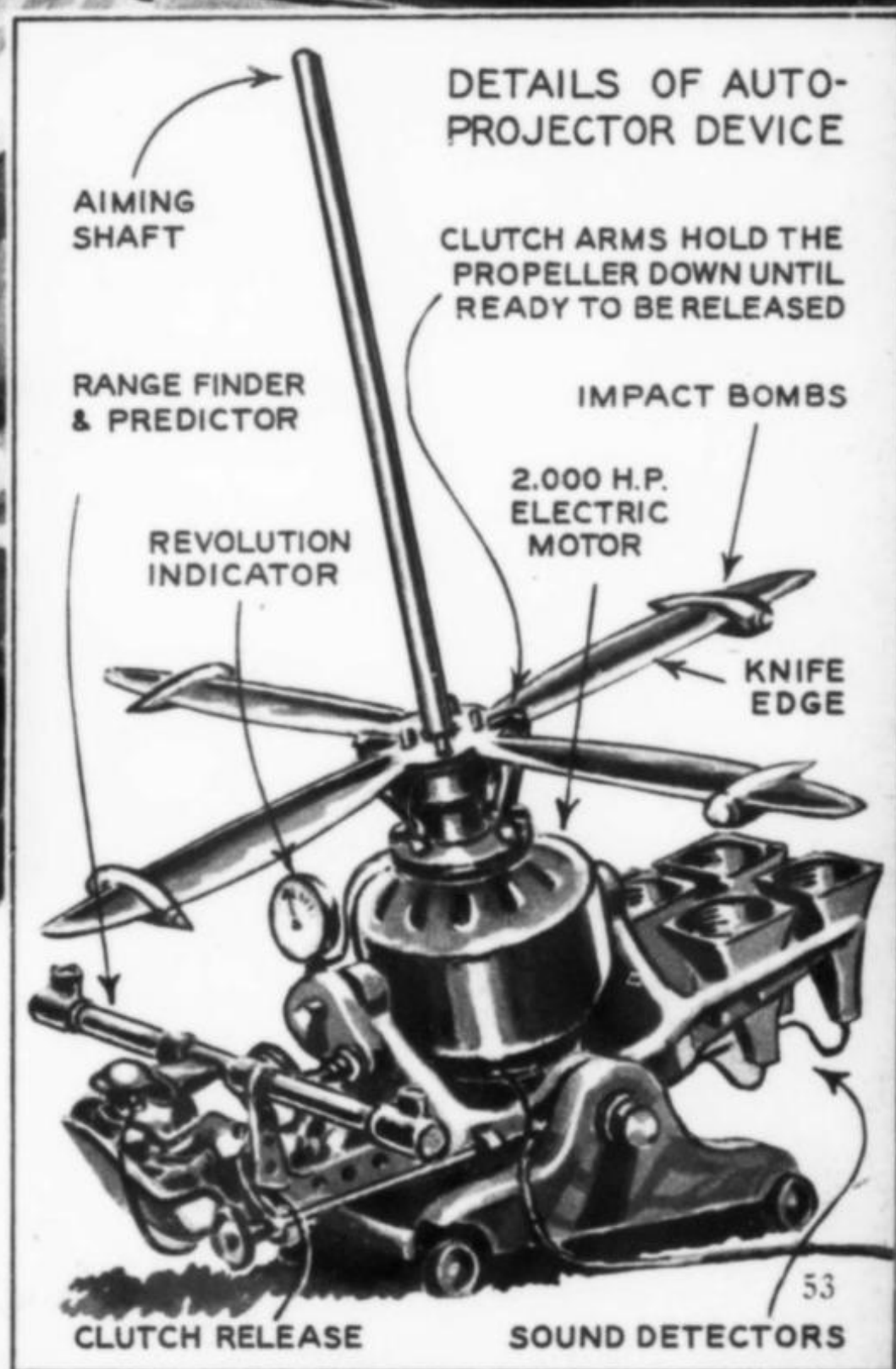
Mechanix Illustrated

per
It's
of
hor
wh
ran
Ma



per minute, cutclimbing the mightiest plane. It's initial R.P.M. of 10,000 would store much of the stationary propelling motor's 2,000 horsepower. Sent up in vast "clouds," these whirling aerial knives would plow into the ranks of the invaders, cutting their planes to

May, 1941



CONTROLLABLE
SURFACES

pieces, then exploding to complete the work. Their giant blades would cover an area of more than 200 square feet constantly during both ascent and descent instead of less than one square foot covered by an unexploded anti-aircraft shell! Timing mechanisms would detonate the tip bombs before they returned to earth.

Modern science has also recently revealed the aerial "thinking torpedo," another coming foe of the night raider. Equipped with an engine of 500 horsepower or more, the machine is actually a small, unmanned airplane, laden to the maximum with the highest explosives known! As these ghastly craft would never return from their flights, tiny wings would

500 H.P. DOUBLE-SIX FLAT
2-CYCLE AIR COOLED MOTOR

AUTOMATICALLY RELEASED
CHUTE BRINGS DEVICE TO
LAND IN EVENT OF A MISS

EXPLOSIVE CHARGE IS
SURROUNDED BY GAS
TANKS FOR MOTOR
THUS MULTIPLYING
DAMAGING EFFECT
OF INITIAL CHARGE

BULLET-PROOF SKIN

PHOTO-ELECTRIC CELLS TO
AUGMENT THE ELECTRIC
EARS FOR OPERATION IN
SEARCHLIGHT BEAM OR
TO TRACK EXHAUST FLAME
OF THE ENEMY AIRCRAFT

COOLING DUCT INLET

ELECTRIC EARS PICK
UP AND STEER TO-
WARDS MOTOR AND
PROPELLER NOISE

DOUGLAS
ROLFE

OUTER AND INNER
DRIVE SHAFTS TO
TWIN PROPELLERS

CONTROL MECHANISM

OUTLET DUCT FOR COOLING

DIRECTIONAL CONTROL CYRO

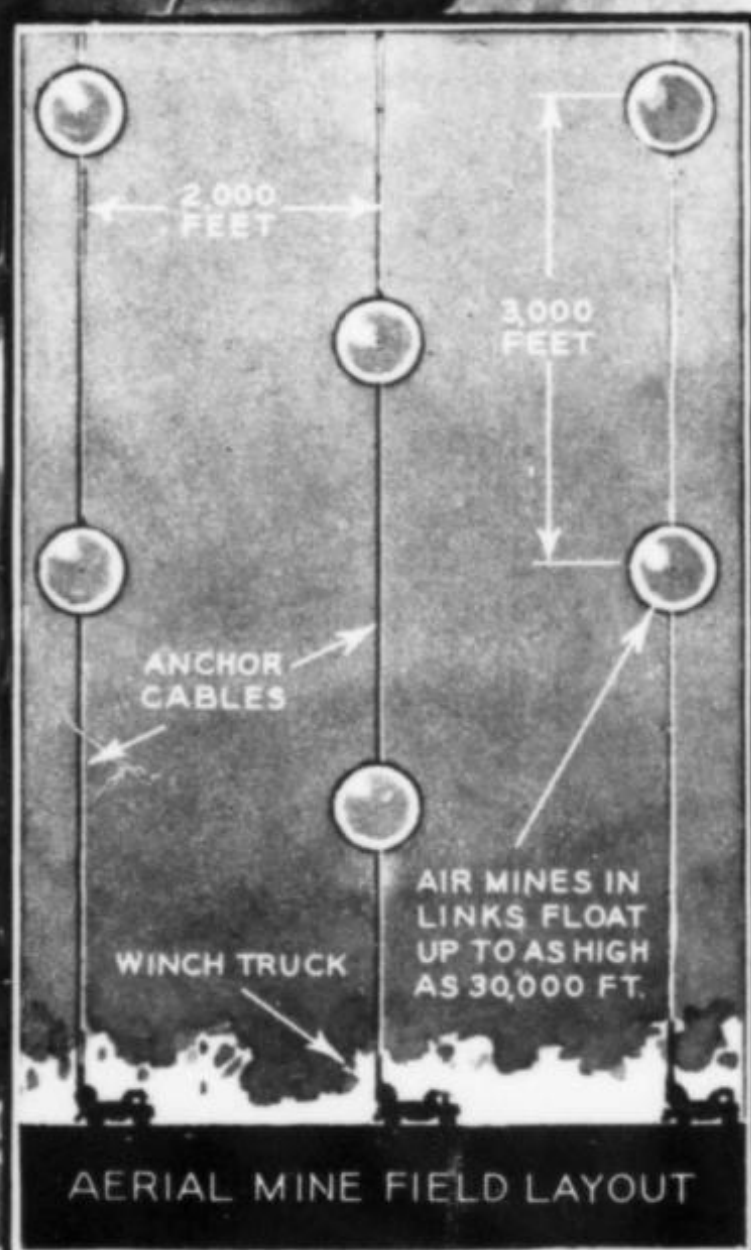
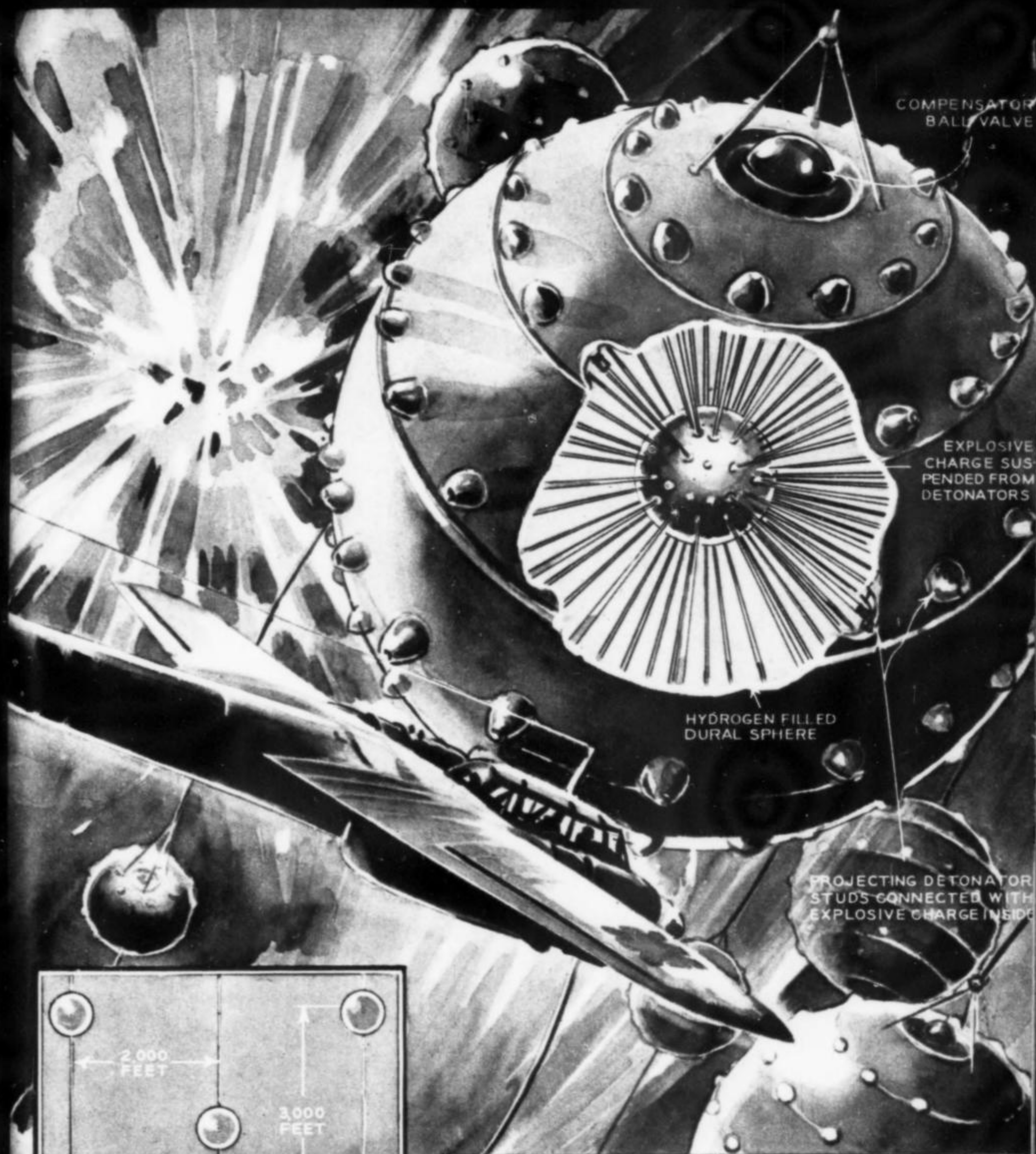
IN TYPE
IMPACT FUSE

AS AERIAL TORPEDO
LEAVES CATAPULT
AIR RESISTANCE
BUILDS UP—SPINS
PROPELLERS
STARTS SELF
CONTAINED
POWER
PLANT

LAUNCHING
CRADLE

COMPRESSED
AIR TANKS
FURNISH THE
LAUNCHING
IMPETUS

CATAPULT



suffice, landing speed being immaterial. The result would be a terrific top speed, far in excess of anything attainable by man carrying ships. Automatic electric "eyes" and "ears" would utilize many of the frontier principles recently explored by American physicists. Variations of the photo cell and kindred radio devices would actuate control operating apparatus to guide the fatal flying bomb to its mark—the attacking bomber. Once the little suicide ship singled out its victim, the doom of both would be sealed!

Another gateway to the grave for the bombing
[Continued on page 151]

MECHANIX ILLUSTRATED

SEPTEMBER

STILL
15^c

STACK

16 PAGES IN FULL COLOR—

ROCKET TO THE MOON

MECHANIX ILLUSTRATED

Title registered U. S. Patent Office

W. H. FAWCETT Jr.
President

ROGER FAWCETT
General Manager

Editors: ROLAND CUEVA, BERNARD WOLFE

Associate Editors: Edward Kelly Features
Gilbert Paust Aviation
George Daniels Crafts & Science
Jo McCallion Production

RALPH DAIGH
Editorial Director

BILL WILLIAMS
Executive Editor

SEPTEMBER, 1945

VOL. XXXIV NO. 5

On the cover: Artist Chesley Bonestell's conception of a rocket ship being launched

SPECIAL FEATURES

- WE LICKED THE WOLF PACK—
by Admiral Jonas H. Ingram, Vice-Admiral
P. N. L. Bellinger, and J. N. Miller 35
How the Army and Navy defeated the U-boats
- FLASH OF THE FUTURE—by Bradley Smith 40
Photoflash that lasts a lifetime
- BRITAIN'S WALLS OF FIRE 42
- GARDEN ON A ROCK—by Don Romero 44
Soilless agriculture on Ascension Island
- AT LAST—THE STORY OF RADAR 47
*The Army has just released the pertinent facts
concerning this miraculous device*
- BAKA—by Gilbert Paust 50
Jap suicide plane
- SCIENCE IN PICTURES Beginning on 55
- ROCKET TO THE MOON—by Willy Ley 67
*The ever-fascinating problem of space travel to
the moon is examined factually and scientific-
ally by expert Willy Ley, and illustrated with
full color paintings by Chesley Bonestell*

DEPARTMENTS

- YOUR INVENTION CLINIC 12
- CHIPS FROM THE EDITOR'S WORKBENCH 14
- MONEYMAKERS AND MONEYSAVERS 26
(Classified Ads)

CRAFTS AND HOBBIES

- VANITY AND CABINET 83
- ANIMATED BREADBOARDS 87
- WORKBENCH ELECTROFURNACE 88

- TEST YOUR COORDINATION 91
- HOME AIDS 92
- GRINDING SMALL TOOLS 94
- SERVICING MODEL ENGINES 96
- BEETLE CASTLE GAME FOR CHILDREN 99
- HOMEMADE COMPASS 100
- THE SCHOOL SHOP 102
Lesson No. 30
- MODEL ENGINE CHANKSHAFT 105
- IDEAS FOR SERVICE MEN 106
- "LOCUST" AIRBORNE TANK 108
- STREAMLINED PICTURE FRAME 111
- WINDSOR CHAIR 112
- NEW PRODUCTS 113
- KEEP IT ROLLING! 114
- BOATS AND BOATING 116
- NOVELTY HOUSEWARE 118
- MAKING A LENS SHADE 121
- PHOTO CONTEST 122
- PHOTO KINKS 123
- PRINT MOUNTING BOARD 124
- VOLUME EXPANDERS 126
- THINGS FOR THE BEACH 129
- MEXICAN CHAIR 130

Copyright 1945 by Fawcett Publications, Inc.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville 1, Ky. Printed in U. S. A. Advertising Offices, 295 Madison Ave., N. Y. 17, N. Y. Editorial Offices, Paramount Building, 1501 Broadway, New York 18, N. Y. West Coast Representatives: Los Angeles, H. P. Houston, Edward S. Townsend Co., Pacific Mutual Building; San Francisco, Edward S. Townsend, Edward S. Townsend Co., Russ Building. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Allen E. Norman, Secretary; Gordon Fawcett, Treasurer; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1945 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to Circulation Department, 22 West Putnam Avenue, Greenwich, Conn. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 15c per copy. Subscription price \$1.80 per year in U. S. and possessions, Canadian and foreign subscriptions \$2.30 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds, payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS



BAKA



Now it can be told—the story of the Japs' final, desperate use of suicide planes to ward off defeat.

EARLY one afternoon last spring, a Navy support vessel LCS (L) (3)-33, veteran of the Iwo Jima campaign, was on patrol duty off Okinawa. It was 11 days after the first landings on the island, scene of one of the bloodiest battles of the Pacific conflict.

Suddenly, death from the skies descended upon the LCS. A wave of 15 Japanese dive bombers known as Vals screamed downward toward the ship.

Artist's conception of how the Japanese might adapt the rocket propulsion principle to additional suicide plane types which will not be limited to diving attacks, but which will be able to maneuver and climb to meet our high-flying bombers.



One bomber was brought down about 100 yards off the starboard quarter; it exploded as it hit the water and sank. Another hurtled toward the LCS on the port beam; fire from a 40-mm shell tore off its right wing as it bore down upon the vessel. The commanding officer, Lieut. Carroll J. Boone, turned his ship sharply to port and the plane crashed harmlessly into the water just off the stern.

It soon became apparent that the enemy planes were not merely performing their customary duty of dive bombing, but were concentrating upon *ramming the ship*.

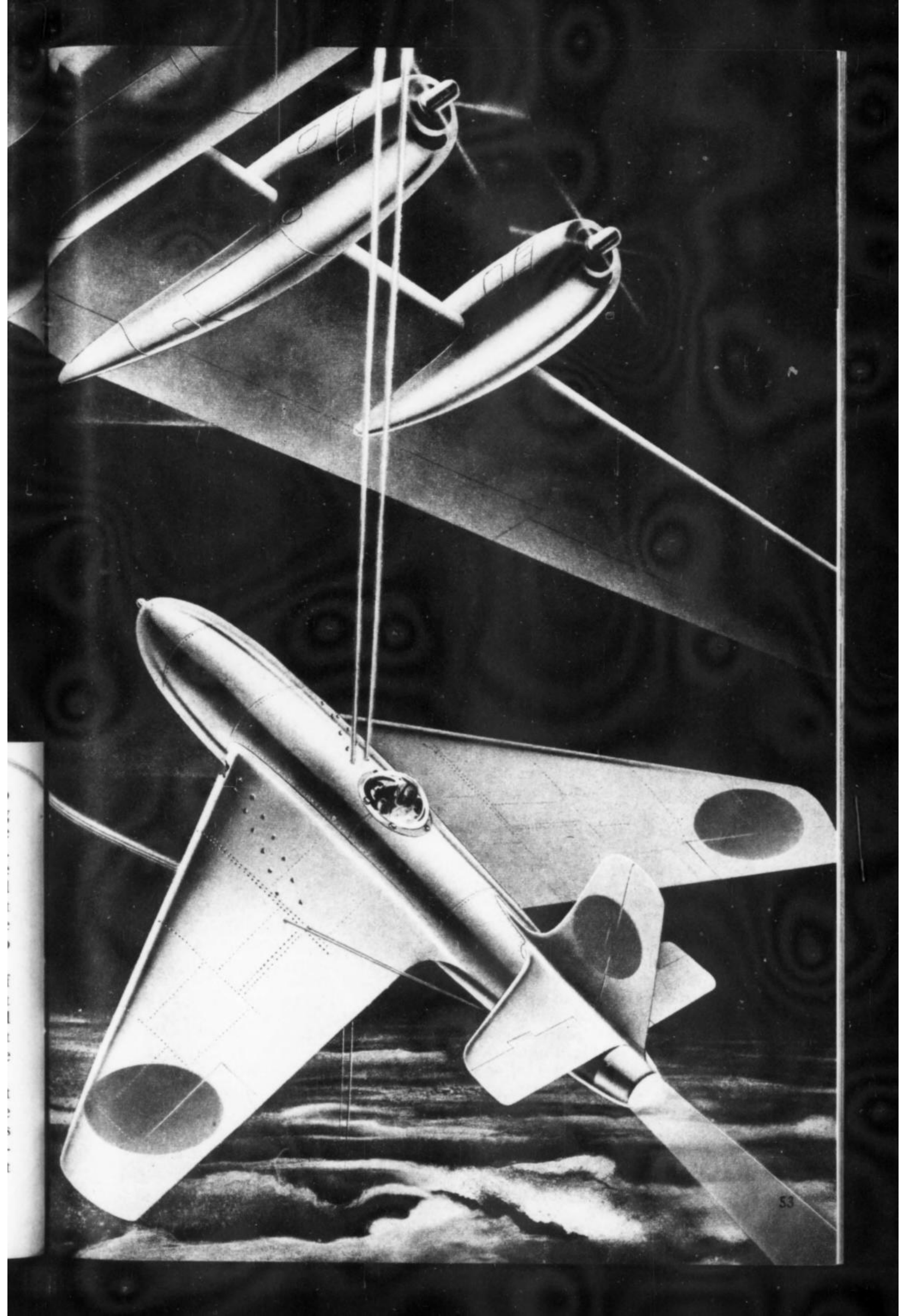
Next came three Vals. One was shot down 300 yards away; another from dead ahead strafed the entire length of the ship. The third with a 100-lb. bomb attached to its belly, struck the LCS on the starboard side.

The attack was successful. Fire from the

plane's gasoline supply enveloped the ship and water poured into it through a gaping hole in its side. Four enlisted men and one officer were killed and 33 others were injured. Lieut. Boone himself was hurled against the tower by the blast and suffered a fractured vertebra of the spine. He continued to direct his men, however, and five minutes after the beginning of the attack, gave the order to abandon ship.

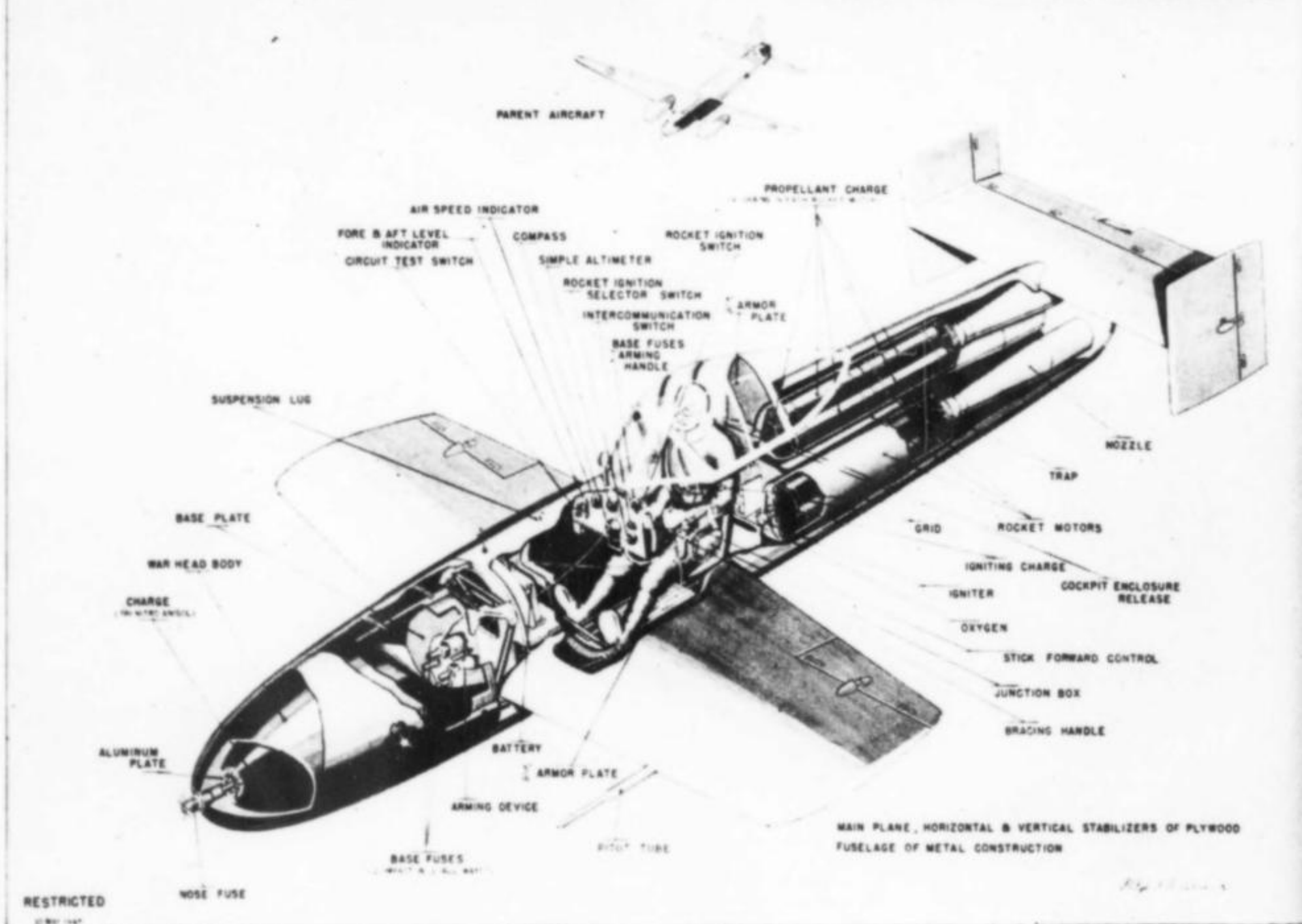
The U. S. Navy has just raised the veil of secrecy from the fanatical Japs who commit winged hara kiri. They are being combated with the same degree of efficiency as that with which our Navy has ruled the seas since war began.

Most of us have been of the opinion that Okinawa marked the start of the Jap suicide tactics. Actually, they started many months earlier, but their operations at first resembled so closely ordinary dive bombings that



BAKA

ROCKET PROPELLED PILOTED AIRCRAFT BOMB SPAN - 16' 5" LENGTH - 19' 10"
TECHNICAL AIR INTELLIGENCE CENTER
NAVAL AIR STATION, ANACOSTIA D.C.



no one seemed inclined to brand them as being outright "suicidal." However, starting with Okinawa, the attacks have followed a regular pattern and there is only one answer: the suicide attacks are part of a carefully conceived military plan.

For these attacks, the Japs use Bettys, Zekes and, as a matter of fact, just about every plane in their book. Sometimes they dive from great heights; at other times they come in low over the water. Frequently two of them attack at once, one at each end of the ship. As many as 40 in a single wave have been reported.

Recently, the Japs have introduced a new type plane into their suicide activities. It is a rocket-propelled, piloted flying bomb, called by our pilots "Baka" or its translation "stupid." This weapon is unique in all history. Its wing span is only 16 feet and the span of its tail is 8 feet. It is 19 feet long, camouflaged gray-green and is built of light

metals and wood, being extremely inexpensive to produce. The pilot is sealed into a tiny cockpit and has limited control over his craft in its death dive. Carried under the belly of a Betty bomber, it is released over its target and rockets downward at a speed between 400 and 600 miles per hour.

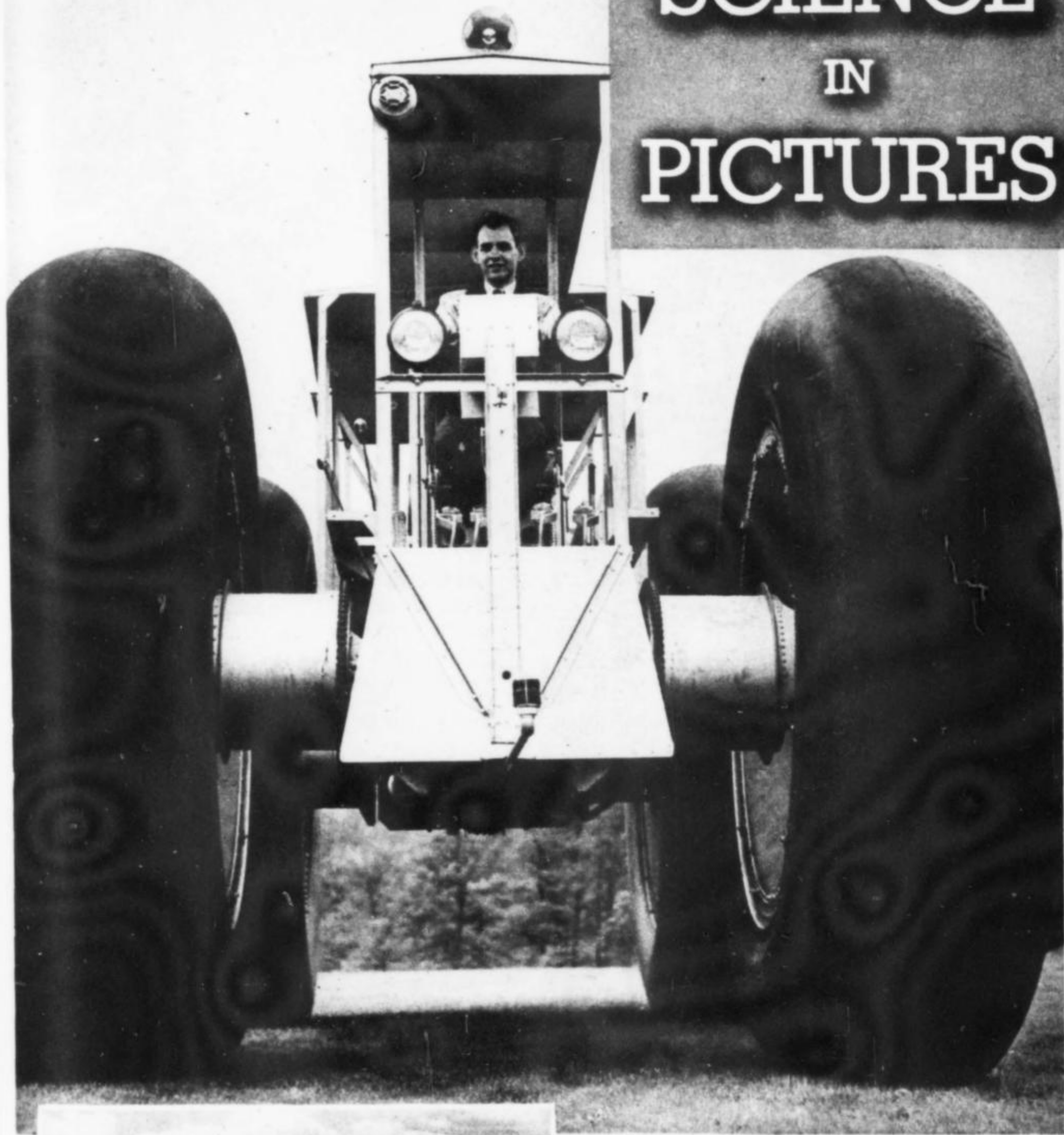
Its nose is a warhead, covered with armor-piercing steel and containing about 1/2 ton of explosive. It explodes upon contact.

The pilots belong to a society known as "Kami-kaze" or "divine wind." Before their extremely short military career, they are given six months [Continued on page 143]

Actual photo of one of the weirdest weapons in all history. This Baka was abandoned on Okinawa field.



SCIENCE IN PICTURES



Marsh Buggy with tires ten feet high and five and a half feet around will be used for oil explorations in Central America and the southern United States. Hollow, airtight aluminum drums serve as wheels and the buoyant combination of drums and tires enables it to navigate water (at 4 mph.) as well as land (at more than 20 mph.).

AVIATION • INVENTIONS • HOBBIES

10¢ MECHANIX ILLUSTRATED

JANUARY
NSC

(Rear Cover) P.M.C. Co.

A HARCETT PUBLICATION

FIGHTER PILOT
AT P-39 CONTROLS

AERIAL RAILROADS!

See Page 46

For Coming Revolution In Transportation

MECHANIX ILLUSTRATED

W. H. FAWCETT, JR., President

Editors: Roland Cueva Bill Williams

Associate Editors: George Daniels, Aviation; Norman C. Lipton, Photography; Thomas J. Naughton, News

Copyright 1942 by Fawcett Publications, Inc.

SPECIAL FEATURES

On the cover: A U. S. Army fighter pilot at the controls of a P-39, also known as the Airacobra, wearing the special mask used for flying above 10,000 feet, and a throat-microphone. Kodachrome by Rudy Arnold.

- Inside a Nazi Sabotage School!** - - - - - 35
by "S. K.," author of the best-selling book,
"Agent in Italy"
- How Good Are Our Planes?** - - - - - 39
The meaning of the OWI report on America's
battle aircraft
- North American "Burma Road"** - - - - - 44
America's new highway to "the most strategic
place in the world"
- Coming Wonders of Transportation** - - - - - 46
by Donald G. Cooley—the fourth of MI's
blueprints for life after the war, in "A World
You Never Knew"
- Drum Talk** - - - - - 54
by A. I. Good—How African wireless works
- ANNOUNCING—MI's NEW CONTEST!** - - - - - 58
- The Darndest Things Help Build a Plane!** - - - - - 60
- Red Giants and White Dwarfs** - - - - - 61
by Willy Ley—biographies of stars
- Tank-Trappers** - - - - - 65
by A. Eriss—some modern American pioneers
- The Focke-Wulf F. W. 190** - - - - - 68
An analysis of Germany's best fighter
- Can YOU Be a Pilot?** - - - - - 70
Test yourself for the Air Corps!
- This Is a Small-Boat War!** - - - - - 74
by Captain Charles Borden—the PT's and
their death-dealing cousins
- PLUS—59 Pages of Crafts & Hobbies starting on** 95
(Continued on page 8)

THE MECHANIX ILLUSTRATED ADVISORY INVENTIONS BOARD

WILBUR SHAW

Noted automotive engineer and
inventor

CLYDE PANGBORN

Aviation pioneer

DR. LOUIS D. CLEMENT

Noted physicist, chemist and
inventor

SIR HUBERT WILKINS

Scientist and explorer

DR. JAMES L. CLARK

Explorer and Assistant Curator of
the American Museum of
Natural History

LT. COMDR. BOB BARTLETT

U. S. Navy

ROBERT COLES

Noted astronomer, Assistant
Curator of the Hayden Planetarium

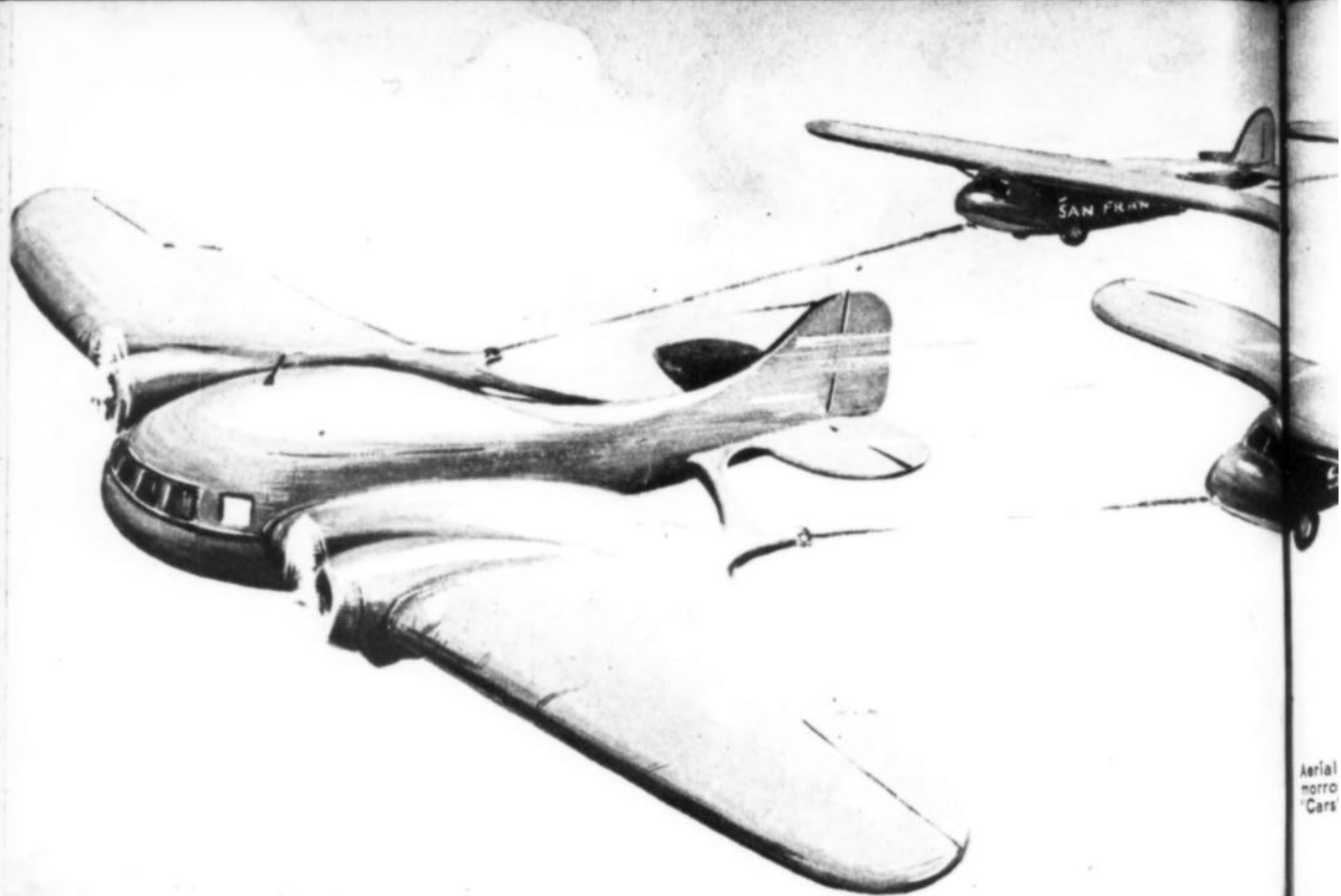
NEXT MONTH

Archie Gibbs, American seaman, has been torpedoed twice within 48 hours and has been held a captive aboard a Nazi submarine for four days, fearful of his life every second of that time. For his bravery, he has been awarded a medal by President Roosevelt. He knows perhaps better than anyone else the spirit of the heroes of our Merchant Marine—those unsung fighters who keep the supplies flowing to a dozen fronts so that our fighting men can battle the enemy. He has a wonderful tale of guts and bloodshed to tell about the men who are carrying out this struggle against U-boats and the raging seas. For one of the most stirring first-person tales you have ever read, be sure to see Archie Gibbs' "Heroes Without Uniform" in your February MECHANIX ILLUSTRATED.



MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1942 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 10c per copy. Subscription price \$1.00 per year in U. S. and possessions. Canadian subscriptions not accepted. Foreign subscriptions \$2.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS



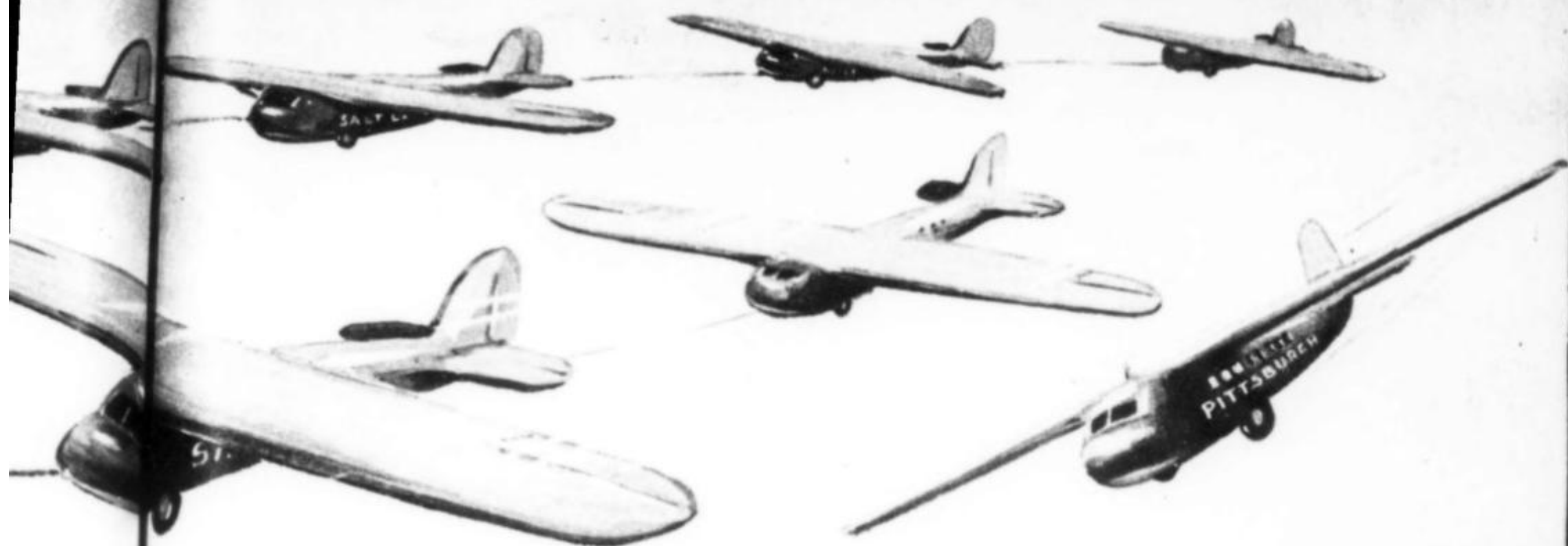
Aerial
motor
'Cars'

coming wonders



Fourth in the MI Series

"A WORLD YOU NEVER KNEW"



Aerial locomotives will haul tomorrow's trains through the sky. "Cars" glide off at each station.

OF TRANSPORTATION

by Donald G. Cooley

*Designs by Fred Ripperda
and Martial & Scull*

"I DON'T see why you have to spend Saturday and Sunday in London, just when I'd planned on your mowing the lawn," your wife complains. "But if you're determined to go, I'll fly you down to the Minneapolis airport in the helicopter. I have some shopping to do in the city."

It's nice to have your wife act as your air chauffeur and you tell her so. It is a mere 200 miles from your Northwoods home to Minneapolis and you wouldn't mind taking

The flying "locomotive" flies low to pick up passenger-loaded gliders at "local" stops. The pick-up system has already been tested in actual use experimentally and proven practical.



the glider bus that picks up a local coach at Bemidji, a few miles away. Secretly, you would rather pilot the family plane which would make the trip in a little over an hour, but your son John has a dance date in Chicago and has spoken for the ship.

Anyhow, your wife gets such a kick out of her helicopter, which she learned to pilot at the age of fifty, that it's a sheer pleasure to watch her demonstrate how she can land on a handkerchief, make vertical takeoffs, and stand still in the air while she repairs her makeup. So you stow an overnight case in the helicopter cabin and are off.

"There's a ten buck fine for slipping out of the 2,000-foot lane," you remind her as you indulge in a little backseat flying.

She knows as well as you that there are traffic officers (naturally they're called "helicopters") scattered among the private planes that crowd the public flyways. Reckless flying will bring a gruff

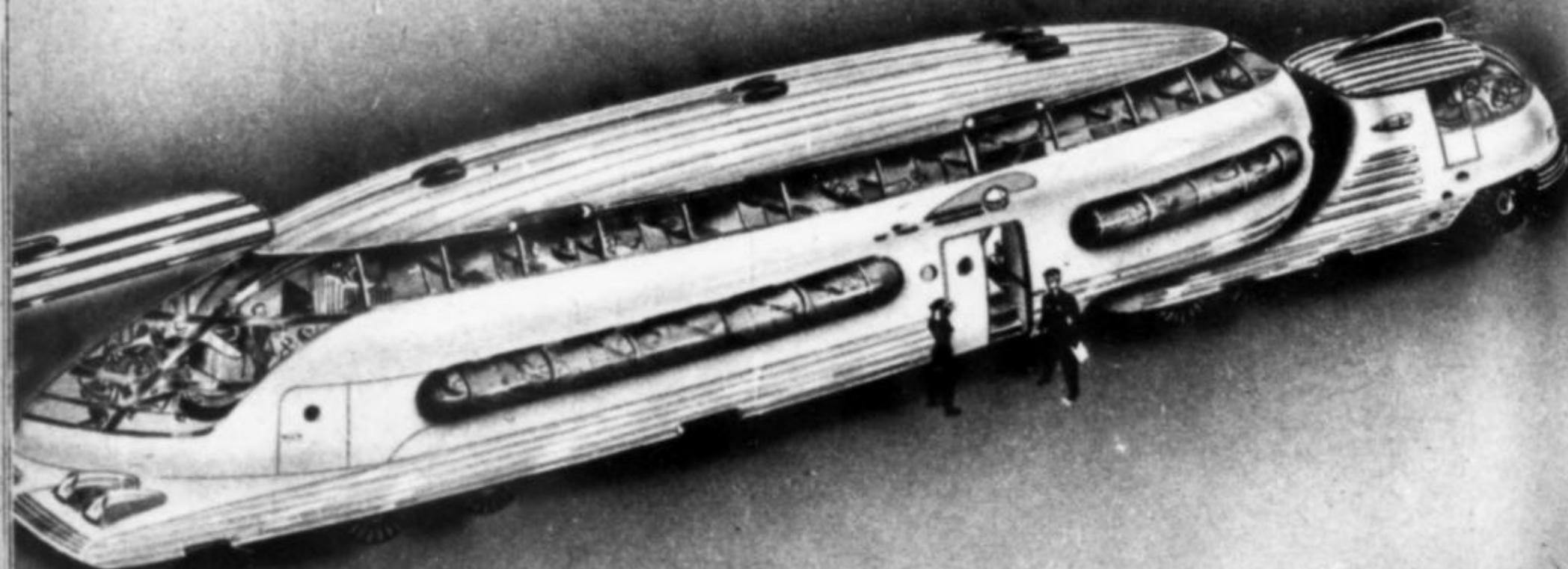
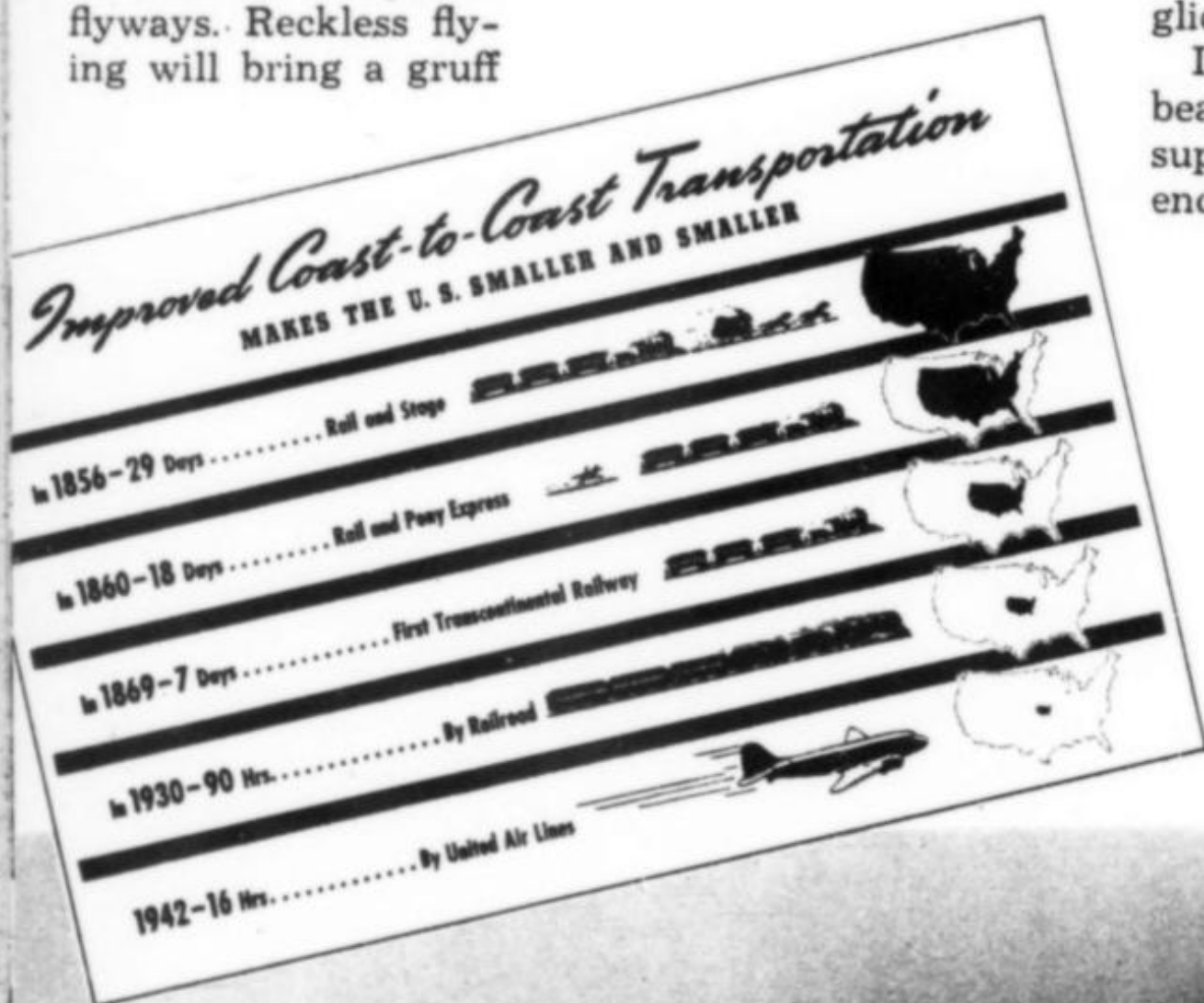
"pull down to that landing field" order over the radiospeaker on the instrument board. Landing strips are spaced ten miles apart, clearly marked and lighted at night, and your wife is secure in the knowledge that if her motors conks out—something almost unheard of now—she can coast into a field or merely float vertically downward, landing lightly as a feather.

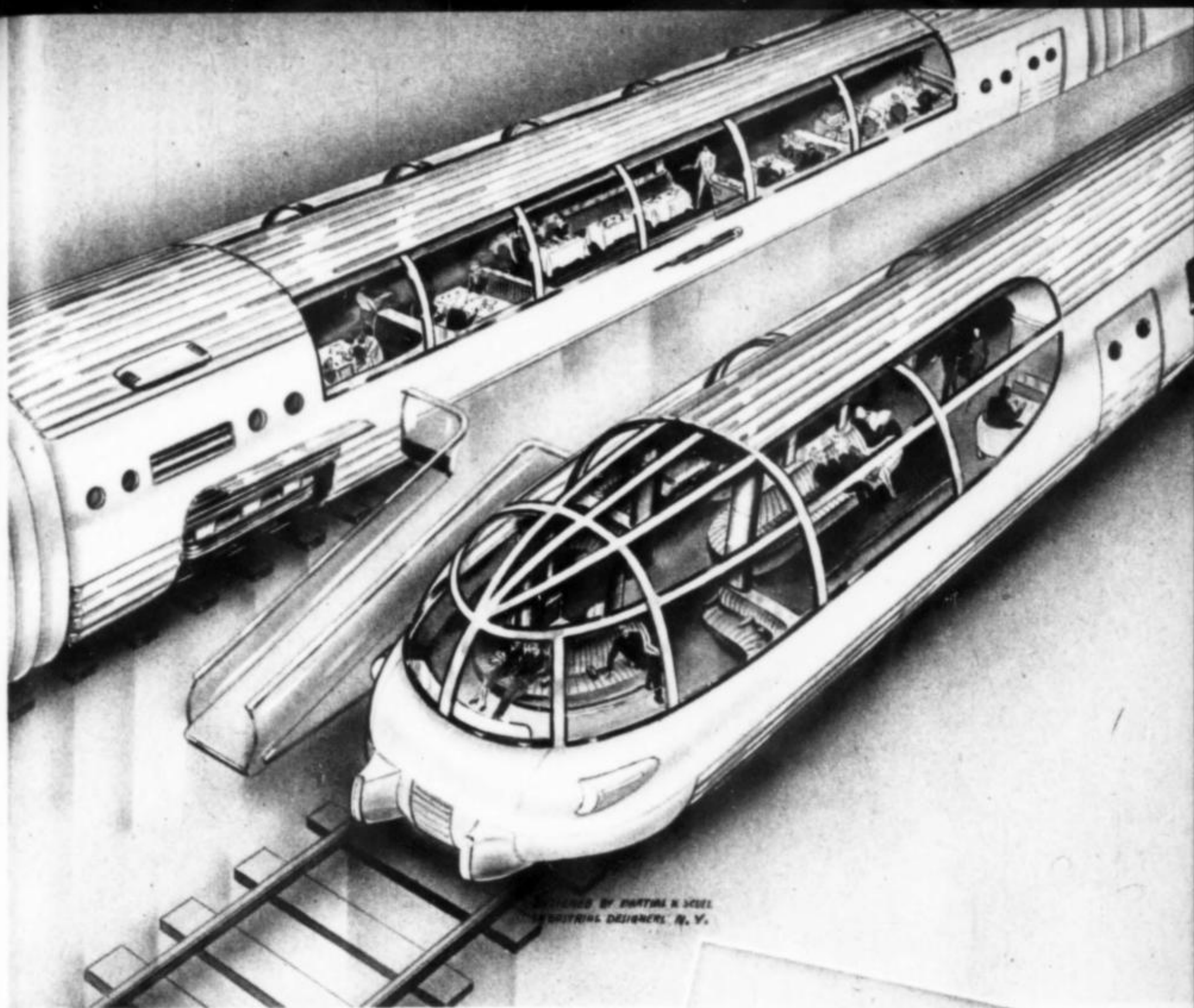
At the Minneapolis field the helicopter is parked near a string of aerial taxis and fly-it-yourself planes. They are waiting to pick up passengers from the transcontinental air-train and are designed for short-hop flights to smaller towns and cities off the main line. In the airport waiting-room you watch your east-bound glider train approaching on a wall-size television screen. Still a hundred miles away—just time enough to buy your ticket and kiss your wife goodbye before you step out into the New York glider.

It's parked on the runway, a great beautiful craft with motorless wings supporting a cabin amply large enough to accommodate the sixty-odd passengers already aboard. A cable stretches from its nose and is draped across a pair of upright posts a couple of hundred feet ahead of it.

Chart at left brings transportation up-to-date. Speed is constantly increasing.

If you travel by bus, this should suit you. Private compartments forward, cocktail lounge in rear, all fully air conditioned.





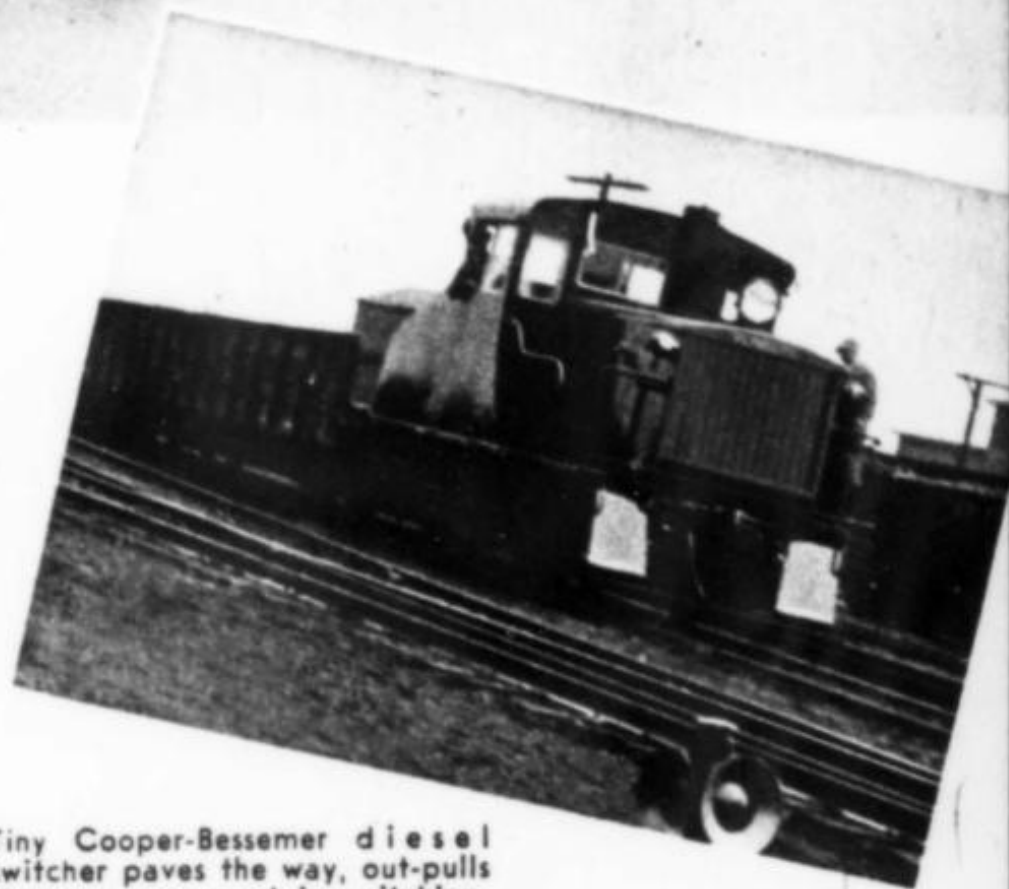
Sleek diesel trains for rail travelers will provide all the comforts of a fine hotel plus perfect man-made weather; all this, and speed, too. These will whisk you swiftly across the country.

Through a transparent section of the glider roof you see the air train approaching. First comes a stubby locomotive plane, little more than a motor-studded flying wing, pulling glider coaches in its wake like a flight of ducks in V-formation. An end glider with passengers for Minneapolis cuts loose, coasts to a graceful landing at the far edge of the field, while the rest of the train makes its pickup run above you.

Your pilot converses by radiophone with the locomotive crew. A dragline from the power plane snakes down, engages your cable—the field recedes below you and with less sound than a bird taking wing, you're in the air.

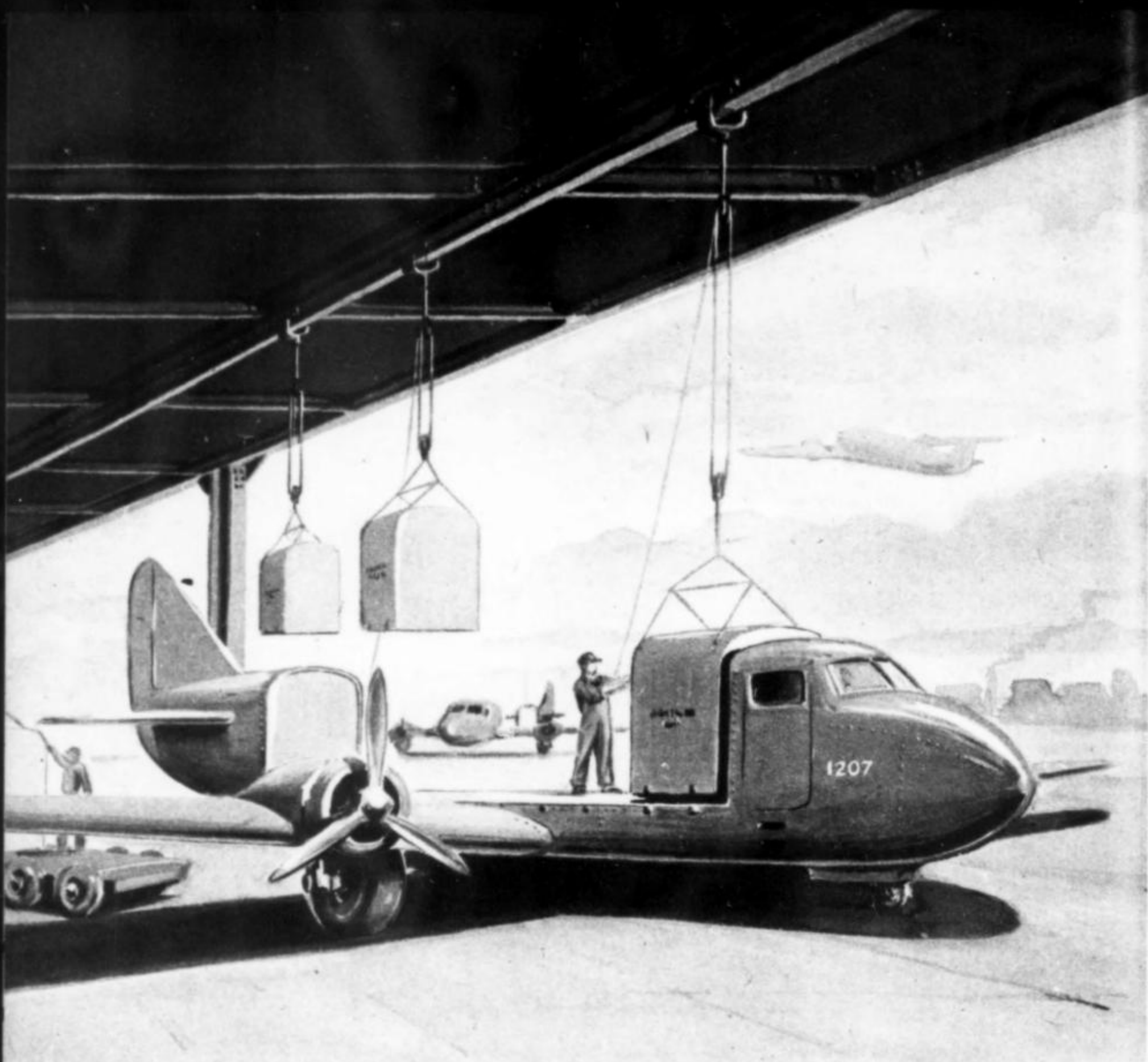
Literally, you ride on clouds. You soar out of range of earthbound noises soon after you hear your wife, far below, shout a reminder to bring home a jar of Stilton cheese from a little store near St. Paul's Cathedral.

Safety you take for granted. In front of the glider pilot and in the locomotive plane far ahead, is a cathode-ray screen that gives a



Tiny Cooper-Bessemer diesel switcher paves the way, out-pulls steamers now used in switching.

running picture of the ground below or obstacles ahead—wherever it is pointed. Infra-red rays formed in a television transmitter are sent directly forward to the instrument-board receiver. Infra-red rays are "invisible light" which penetrates fog or darkness with perfect ease—the basic principle of "noctovision" which enables night fighters, secretly equipped, to down enemy raiders. In darkness black as a sealskin coat, and fog thicker than a Russian accent, a daylight-clear picture



Not a wild dream, but a type of sectional freight plane based on a Curtiss-Wright suggestion for future aircraft.

of terrain is always before the pilot's eyes.

Suppose, though, that your locomotive should crash into a mountain. Your coach can cut loose and because of its light wing-loading land at low speed. It has no motors, no gasoline, so there is no fear of fire, the dreadful spectre that accompanies crash landings.

Four hours later you land in New York after a non-stop flight during which you have dropped coaches at Chicago, Cleveland, and Pittsburgh and picked up others with passengers for the East coast. You have hours to spare before the night air express takes off for London.

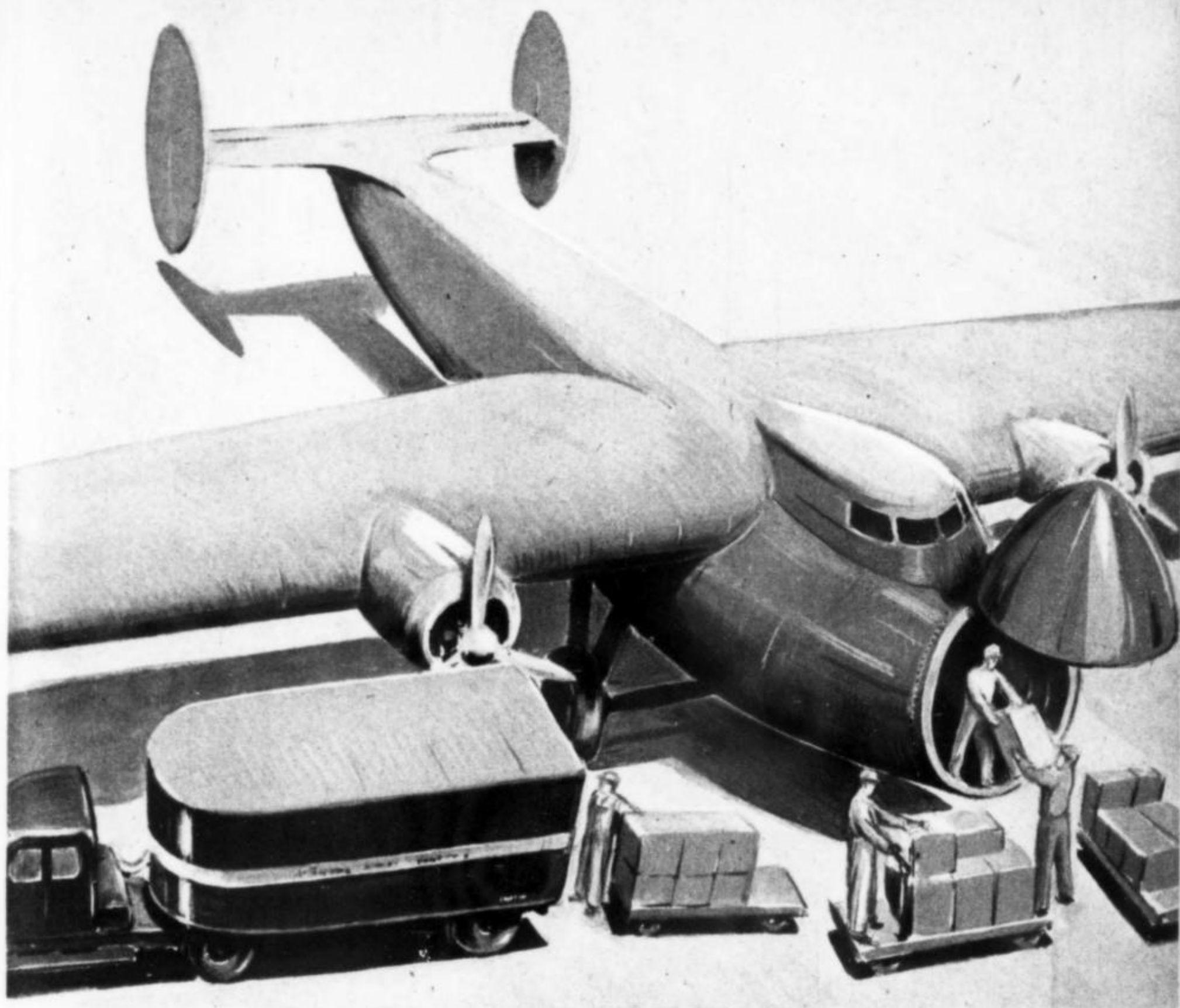
If all this strikes you as a wild flight of fancy, give ear to what leaders in aviation have to say about it. Casey Jones, President of the Casey Jones School of Aeronautics, speaks for dozens of his fellow authorities when he says:

"We may see long glider trains hooked

behind a commercial plane or air express ship, enabling each family to drop off as the air train nears their destination. The new government Glider Pilot Training program will do much to advance this possibility. While in the slightly more expensive classification, light single or twin-engined ships will carry an entire family in greater safety and comfort than we now enjoy in the automobile."

Without much ballyhoo, the government has indeed been training hundreds of glider pilots, to such good effect that at this very moment transport glider trains are carrying men and supplies to American forces. Some day these pilots will take their places in the world we are fighting for. Make no mistake about it, the air-train principle is already here, and here to stay.

The logic of it is irresistible. An air locomotive can pull twice as many passengers in gliders as the same motors could carry in a single ship. Takeoff loads are split into several



Another Curtiss-Wright idea on future aerial freighters is this nose-loaded giant. Crew would ride above cargo hold.

units, making this extra capacity possible, for once a load is in the air it does not require nearly the power needed to get it off the ground. Travel is faster because its non-stop, safer for reasons already mentioned, and quietly comfortable beyond anything you have experienced. All these corner-cuttings reduce the cost of flying, giving the pocket-book appeal which wins the final touch of public approval.

Glider trains do not mean that more conventional airliners will be out of the picture. Many airline executives view such liners as ships of 100-passenger capacity, ready shortly after the war. In the field of transportation as nowhere else there is going to be terrific competition until the "bugs" are shaken out of new developments and each medium finds the niche it is best suited for.

In private air transportation, for instance, the helicopter will fight it out with the fool-proof family plane and both of them will com-

pete with the automobile. Igor Sikorsky has definitely proved that the helicopter is feasible. Since man first dreamed of flight the helicopter has been the unattained ideal: a craft that could rise and descend vertically and stand still in the air as if hung from a sky hook. Uncounted hundreds of inventors have lost their fortunes and their hearts trying to perfect one.

All the more exciting, then, to watch Igor Sikorsky demonstrate his helicopter at his big Stratford, Conn., factory. The craft has a light frame fuselage and the motor drives rotating wings mounted above the center of gravity, like a fan on its back. Sikorsky steps into the cockpit, the wings rotate and the craft goes up like an elevator, to stop 100 feet in the air while the pilot lights a cigarette. He brings it down vertically, stops a foot above the ground and leans out to pick up a package. Then he's up again and at 500 feet the motor is cut. The helicopter settles

gently and touches earth like a tired leaf. Not even your Aunt Agatha would scream at the prospect of a dead stick landing.

You see why the helicopter will appeal to a special group of purchasers: it's as easy to run as a sewing machine, can land and be stored in any back yard, takes off vertically from a parking field crowded with cars or other helicopters, enables you to descend on the roof of your own office building, and its rotating wings will lower you more safely than a parachute if the power plant gives out.

"This rotating wing aircraft can rise and descend vertically, move forward, backward, and sideways, and even hover," says Eugene E. Wilson, President of United Aircraft Corporation. "It is possible to construct the helicopter in the form of a light car suitable for travel to and from business. Then, when the distance warrants, you can go up and over by air to your destination!"

There's a prospect for you! Scoot over the highway in your helicar to sell a prospect a bill of goods, then unfold your wings and fly off to your main office a hundred miles away to be on deck for an 11 a. m. conference.

Another big group of personal flyers will

prefer planes which are descendants of some of the light ships developed just before the war. These will be more conventional in appearance, but far from conventional in performance. It can fairly be said that they will take the art out of flying. You won't spend long hours learning how to come out of spins and stalls because the planes won't spin or stall. They will even land crosswind so any narrow strip of land can be used as a field.

Aeronca Aircraft Corporation, a leading producer of light planes, will present new types of personal aircraft after the war.

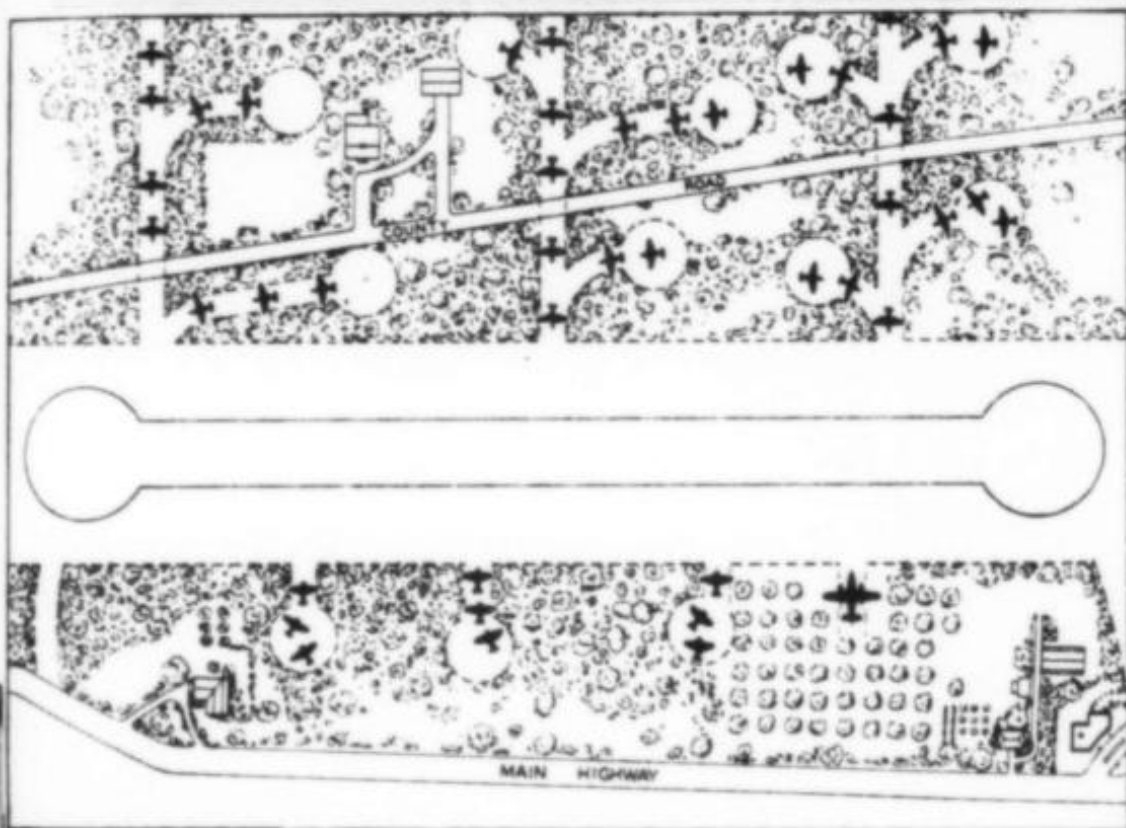
"Many revolutionary designs have been talked about by aeronautical engineers that would change the entire control system, outward appearance of the ship, and result in sensational performance. Many of these designs have possibilities and we know that some of them will be taken off the drawing boards and perhaps, through experiment and research, a first model will be built," says Walter J. Mitchell of the Aeronca Company. "Rather than permit our imaginations to run wild and perhaps create a type of airplane that is seen in Rube Goldberg cartoons, we are setting our sights on several models that we believe will be particularly adaptable to

Heli-flivvers will whisk the man of the house from home to airport, to catch perhaps the morning plane for London.





Airplane runway strips built along highways for military use will serve peacetime air traffic.



about \$25 for carrying two people across the continent!

But we haven't got you to London yet. After taking in a show at the Music Hall to kill a little time, you go out to the airport and stroll aboard the London liner: It's a 500-tonner, an ocean liner with wings, not vastly different in lines from Clippers you have seen, but monstrous in comparison. How big? Well, the *Mars*, the biggest seaplane yet built, has a 200-

foot wingspread, is tall as a house and can carry 150 soldiers with complete equipment. Yet it displaces a mere 70 tons!

This is old stuff to you; so after wandering through the dining salon, playing a rubber of bridge in one of the big card rooms, and looking in on a vaudeville turn in the airliner's theater, you retire to your cabin. It's the size of a hotel room and as you crawl into bed the

[Continued on page 158]

post-war aviation needs. Our primary interest is that any airplane we build be strong, well built, durable, with as much safety built into the ship as we can engineer."

Cessna Aircraft Company has a family plane scheduled for production as soon as victory is won. Says its President, Dwane L. Wallace:

"Its price range will be that of the automobile of today and it will operate far more economically. Safety factors have been developed for our plane of the future far in advance of anything used at present. Learning to fly it will be as simple as learning to drive an automobile."

"Economy" means just that. We already have light planes that deliver 25 miles to the gallon—a gas and oil cost of

YOUR DAILY LIFE TOMORROW

Without your realizing it, great changes have already come into your daily life—in the clothes you wear, the food you eat, your methods of keeping healthy. You are beginning to eat vitamin pills, to wear suits made out of redwood trees, to use many substitutes. Have you any idea, though, how really revolutionary are the changes that will be made in your daily life by the time the war is ended? Read next month's MI: "YOUR DAILY LIFE TOMORROW."

RED GIANTS AND WHITE DWARFS

by Willy Ley

How does the sun burn? What was the
Star of Bethlehem? Here is new light.

THE first event in Christian history was an event in astronomy. The birth of the Christ was marked by the appearance of an exceedingly brilliant star in the Heavens. It was the Star of Bethlehem, the star that guided the Wise Men to the Manger in which the Infant Jesus was born.

There can be no doubt but that such a brilliant star appeared. Many documents, even aside from those of Christian origin, record the fact.

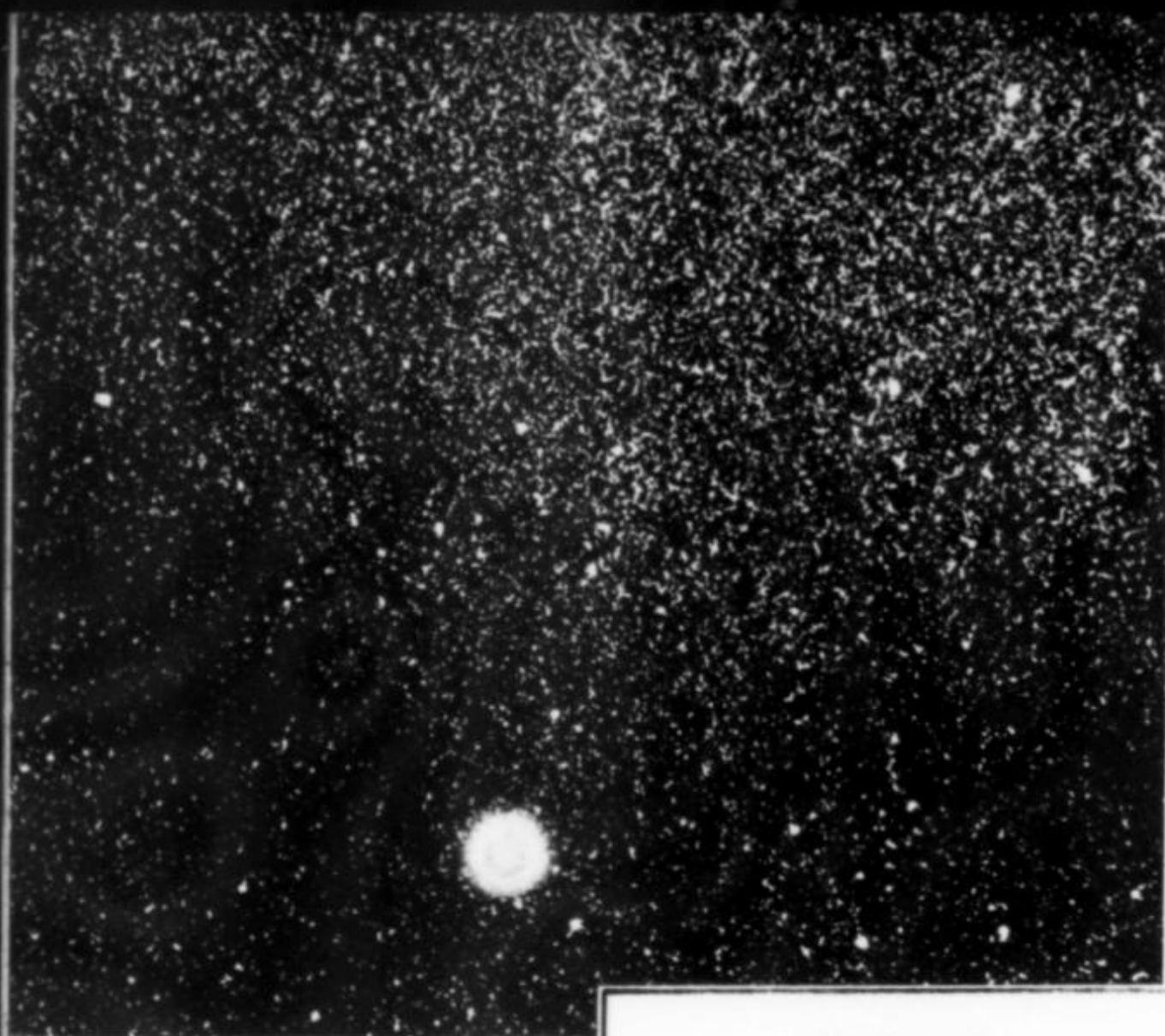
But what *was* the Star of Bethlehem—the star whose replica we hang atop our Christmas tree each year at this time?

For centuries, scientists have been searching for the answer to that question; for the same question involves the most important single question in our daily life: What is the sun? What makes it burn?

In the course of their search for the answer to these questions, they found many strange things about the Heavens—strangest of all the fact that it is peopled with red giants and white dwarfs.

When Tycho Brahe, the famous Danish astronomer of the sixteenth century, was at the height of his glory, the heavens presented him with a spectacle very similar to the Star of Bethlehem. It was in November, 1572, and Tycho Brahe

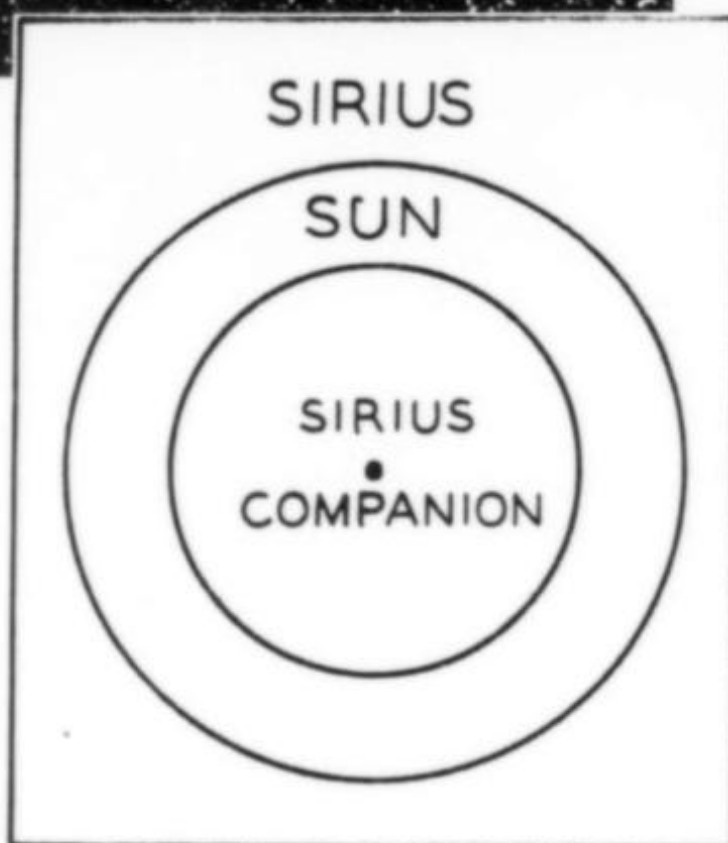




Above: The flare of a "nova." At right: Diagram shows comparative size of star Sirius, our Sun, and Sirius' companion star, a white dwarf" weighing as much as the Sun.

had just begun his routine work, when a star blazed forth with unheard of brilliance in the constellation known to astronomers as Cassiopeia. It was not a star with which the famous astronomer was familiar, in fact he would have sworn that no star at all had been in that spot in the skies the night before.

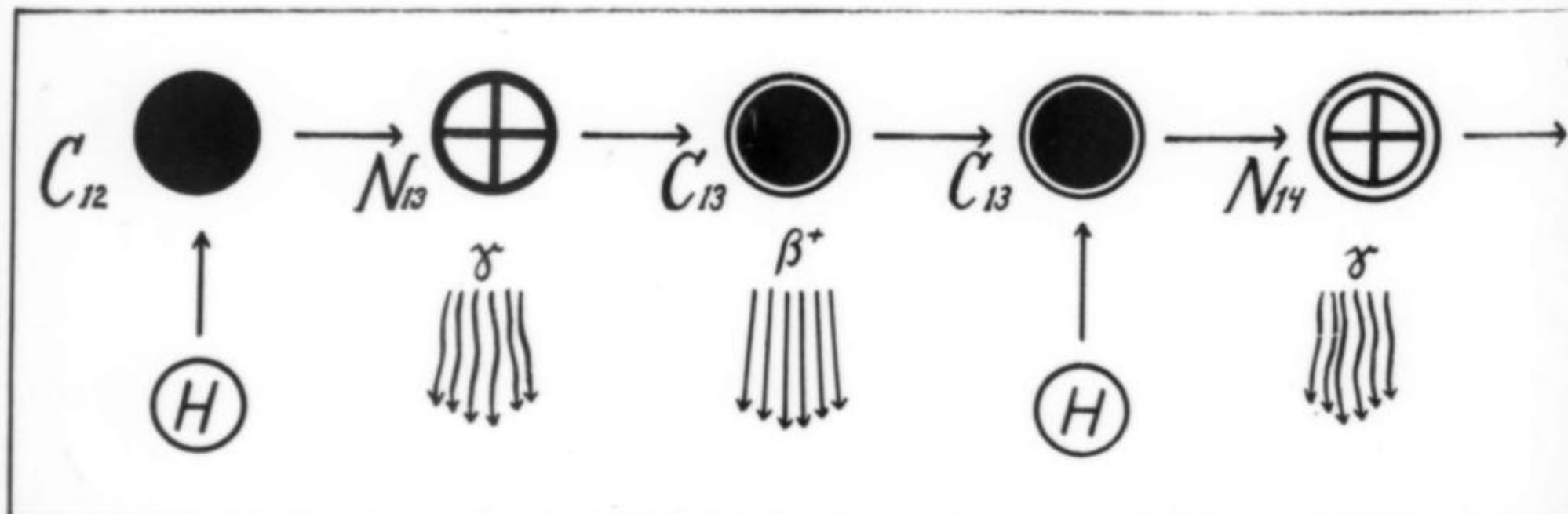
Tycho Brahe's face is said to have been oddly immovable because of the piece of hammered sheet silver that served as part of his nasal bone—the original bone having been smashed in a very common brawl when he was young—but it may have shown emotions then. At first the severely dressed dignified



nobleman simply doubted the testimony of his remarkably sharp eyes. Then it occurred to him that the star might disappear as suddenly as it had come. Wielding a large and massive sextant—Tycho was always proud of his strength—he established the correct position of the new star in feverish haste. The telescope had not yet been invented then, but there was no need for one, *Tycho's Star*, as it came to be called, shone so brightly that it could even be seen during the day. Then it faded away.

Thirty-two years later the spectacle repeated itself and again there was a famous astronomer on hand to observe and to record his observations: Johannes Kepler. Since then no astronomer on earth has witnessed precisely the same event, but otherwise astronomy progressed mightily during the three and three quarter centuries since Tycho's Star.

Tycho had not even tried to find an explanation for the miracle, as he termed it. It was a miracle, that was explanation enough. Besides the great astronomer did not know what the stars really are. Neither did Kepler, even though it was Kepler who found the laws of the motion of the planets, something Tycho had vainly strived to accomplish until he finally called Kepler



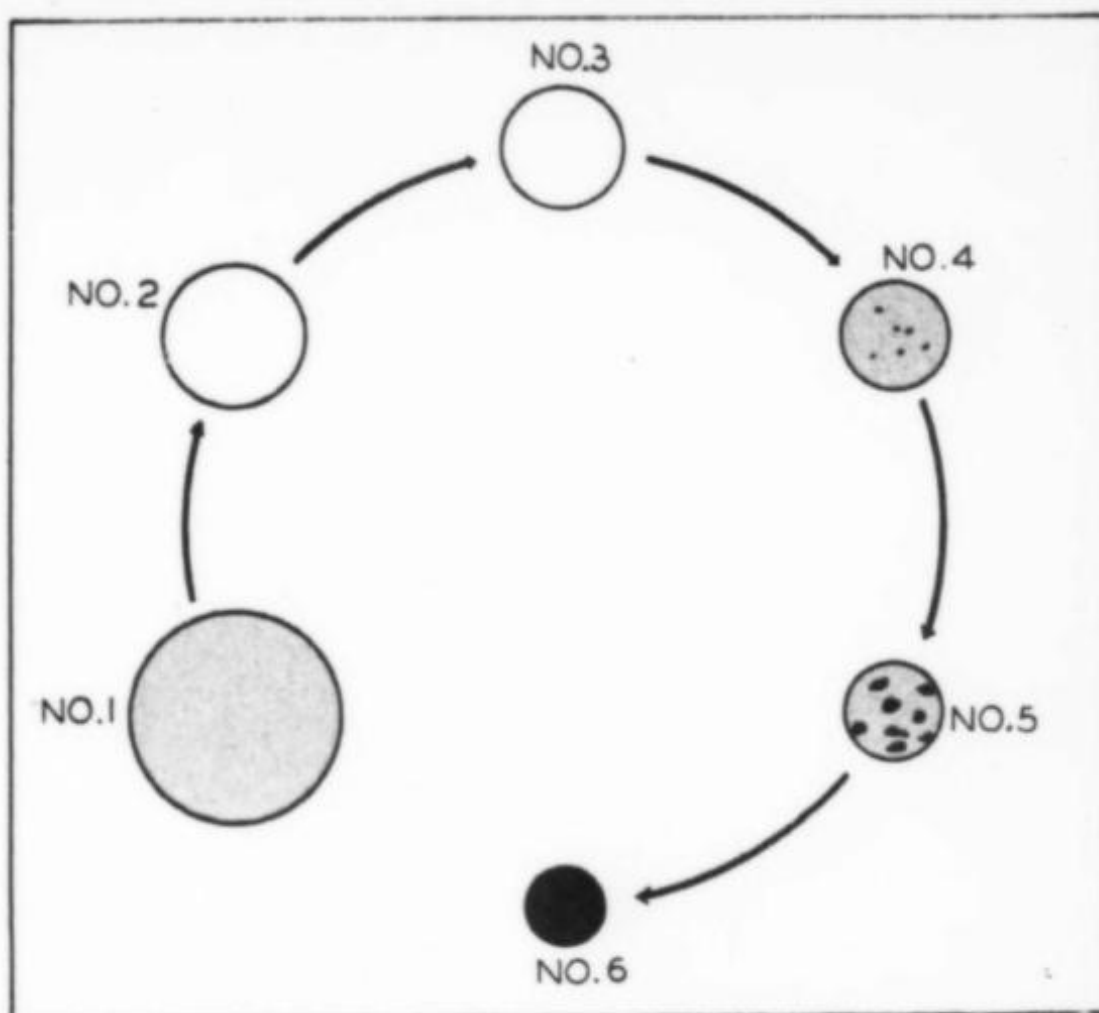
to his aid to do it for him. Kepler, near-sighted and often sickly, was not as good an observer as Tycho, but he was a master of mathematical operations. And through his devotion to mathematical logic he knew that future astronomers would know more than he did. He left the explanation of the phenomenon to them . . .

But though his trust in the future was fully justified, Kepler's successors learned everything else first . . . and they are not even now quite sure just what causes the phenomenon of *Tycho's Star*.

First—it is necessary to skim rapidly through the following three centuries of astronomical history—they had to learn what stars are. It was comparatively easy. Not counting the planets, the "wanderers," all stars were essentially the same as the Sun. They were gigantic spherical blobs of superheated substance, emitting light and heat at an appalling rate all the time. The Sun happened to be very close—a mere 93 million miles as they soon found out. The other suns were billions upon countless billions of miles removed. That made them appear as luminous pin-points.

After that they had to learn that the stars are not strewn through the universe in a haphazard manner but that they were arranged in definite "island universes," or galaxies. The Milky Way, they had to learn, was the rim of the galaxy we happen to be in, the so-called Great Nebula in Andromeda was another galaxy . . . and there were many others, each composed of from 20 to 40 billion suns or stars.

But before they had truly conceived this picture—the real trouble with stars and stellar

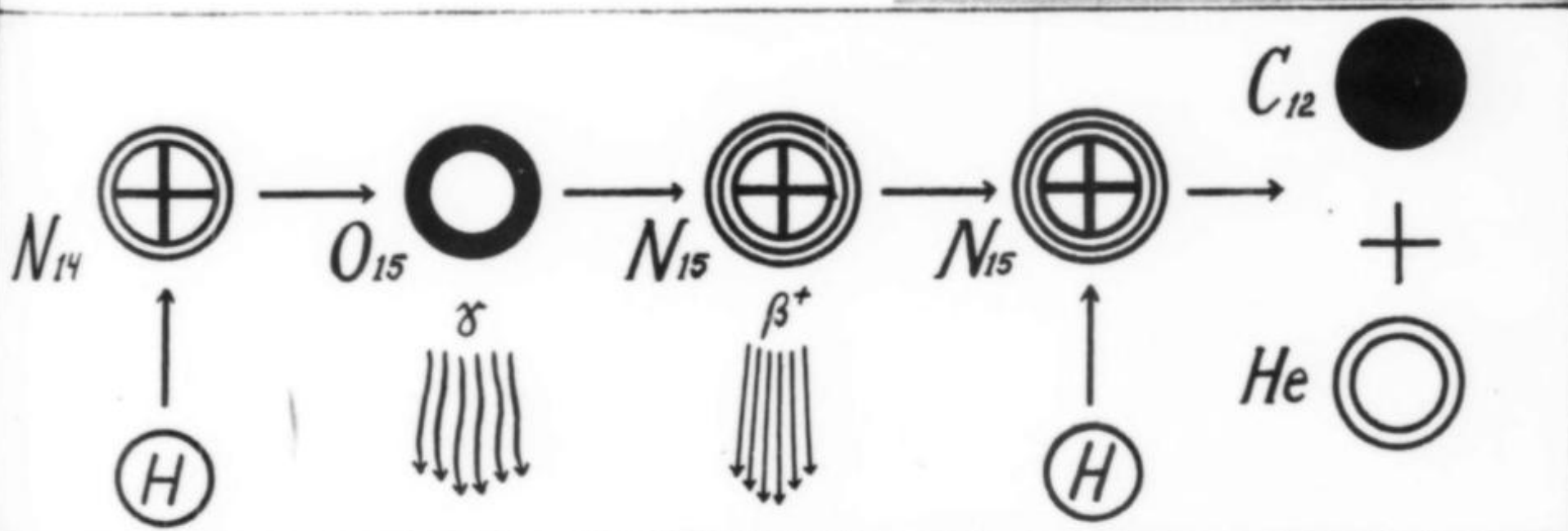


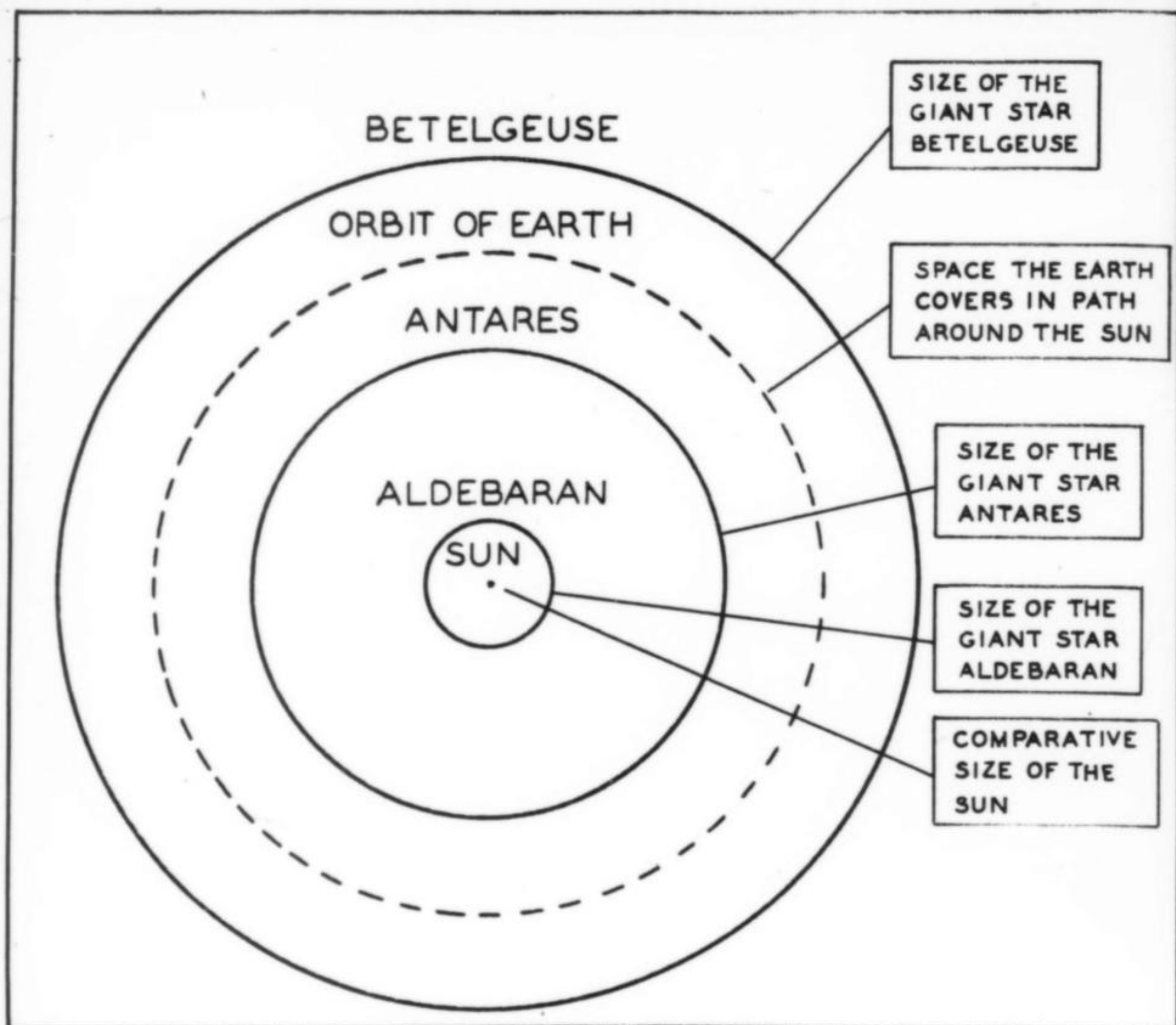
Until recent discoveries, scientists believed that the Heaven's dwarf white stars were caused by the loss of radiation as a giant red star contracted and grew denser. The old conception of what happened is shown in the diagram above. Giant red star (1) contracted and grew to white heat (2); it cooled gradually to become a yellow star (3) with spots (4) which became larger as the star grew older (5), until finally the star became cold and invisible (6). The text explains new theory.

astronomy is that everything exists and happens on so gigantic a scale that the mind needs a long time to get used to thoughts of such magnitudes—they had begun to wonder about the stars of our own galaxy. Some were bright and luminous, like Sirius, the dog star, others were faint and looked reddish. Somehow they gave the impression of being nearer or farther away, but there was no way of

HOW OUR SUN SHINES

Here, across the bottom of two pages, is the chemical formula of what happens inside the sun to give us sunshine. In simple language, what happens is this: A carbon atom unites with a hydrogen atom to start the reaction. This forms a nitrogen atom and releases radiation. In following steps, nitrogen breaks down, four hydrogen atoms are destroyed and sunshine results.





This diagram will give you an idea of how gigantic are the "red giant" stars in our heaven. The earth's path around the sun is 186 million miles, but the star Betelgeuse is even bigger.

measuring the distance or even guessing it from the apparent size, because each and every star showed the same diameter no matter how powerful the telescope: the diameter was in each and every instance zero. All stars were pinpoints of light in every telescope—and even the 200-inch giant on Mt. Palomar is not going to change that. Astronomers had to learn how to measure the distances of the stars and how to determine their true sizes.

It would need a book to tell how they did it, but the fact is that they succeeded. And they learned, almost incidentally, that our own Sun was a nice average star, medium-sized, of medium density, medium-luminous, medium-hot and middle-aged.

There were many other stars like that in our galaxy, but there were also many exceptions. There were stars whiter and evidently hotter than our Sun, Sirius for example, and

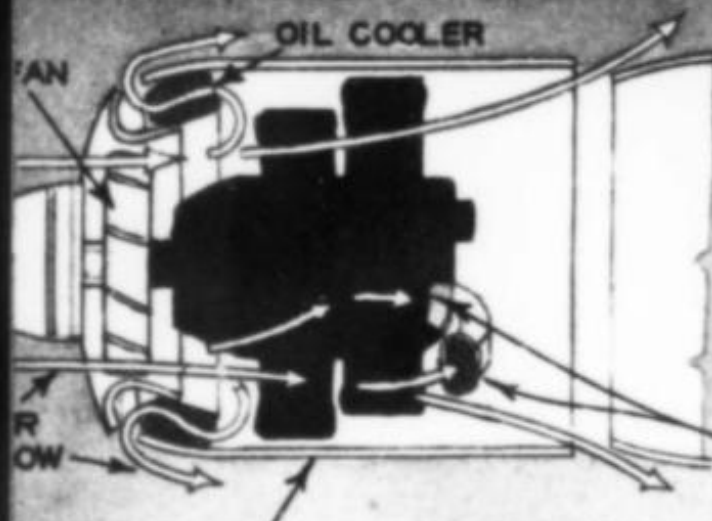
there were stars that were faint and reddish and somewhat decrepit looking. There were others that were also reddish, but apparently of much larger size than our Sun.

Meanwhile astronomers had found themselves troubled by a more specific problem, by a problem connected with the nearest star, the Sun. That star, and all the others too, radiated tremendous quantities of energy into empty space second for second, minute for minute, hour for hour, twenty-four hours a day year in and year out for century after century. Where did these incredible amounts of energy come from? How did the Sun keep going? And for how long could it continue to waste heat and light?

Some had thought of the energy of meteorites falling into the Sun. This thought was correct, no doubt, but could the meteors account for the energy-expense of the Sun? A well-spent half [Continued on page 168]

The Focke-Wulf

F. W. 190



EXCEPTIONALLY CLOSE ENGINE COWLING NECESSITATES USE OF LARGE FAN TO AID COOLING. A REVERSED AIR FLOW PROVIDES HIGHLY EFFECTIVE OIL COOLING

SUPERCHARGER AIR INTAKES

2 1/4" BULLET PROOF GLASS

14 MM. ARMOR PLATE BEHIND PILOT'S HEADREST -- 8 MM. ARMORED BULKHEAD BEHIND SEAT

2 RHEINMETALL-BORSIG 7.92 MM. .314 IN. MACHINE GUNS FIRING THRU PROPELLER DISC (600 ROUNDS PER MIN.)

B.M.W. 801-D 14-CYLINDER TWIN-ROW RADIAL AIR-COOLED ENGINE DEVELOPS 1760 H.P. AT 18 000 FT.

5 MM. AND 3 MM. ARMOR PLATE NOSE RINGS PROTECT ENGINE

OIL COOLING AIR VENTS

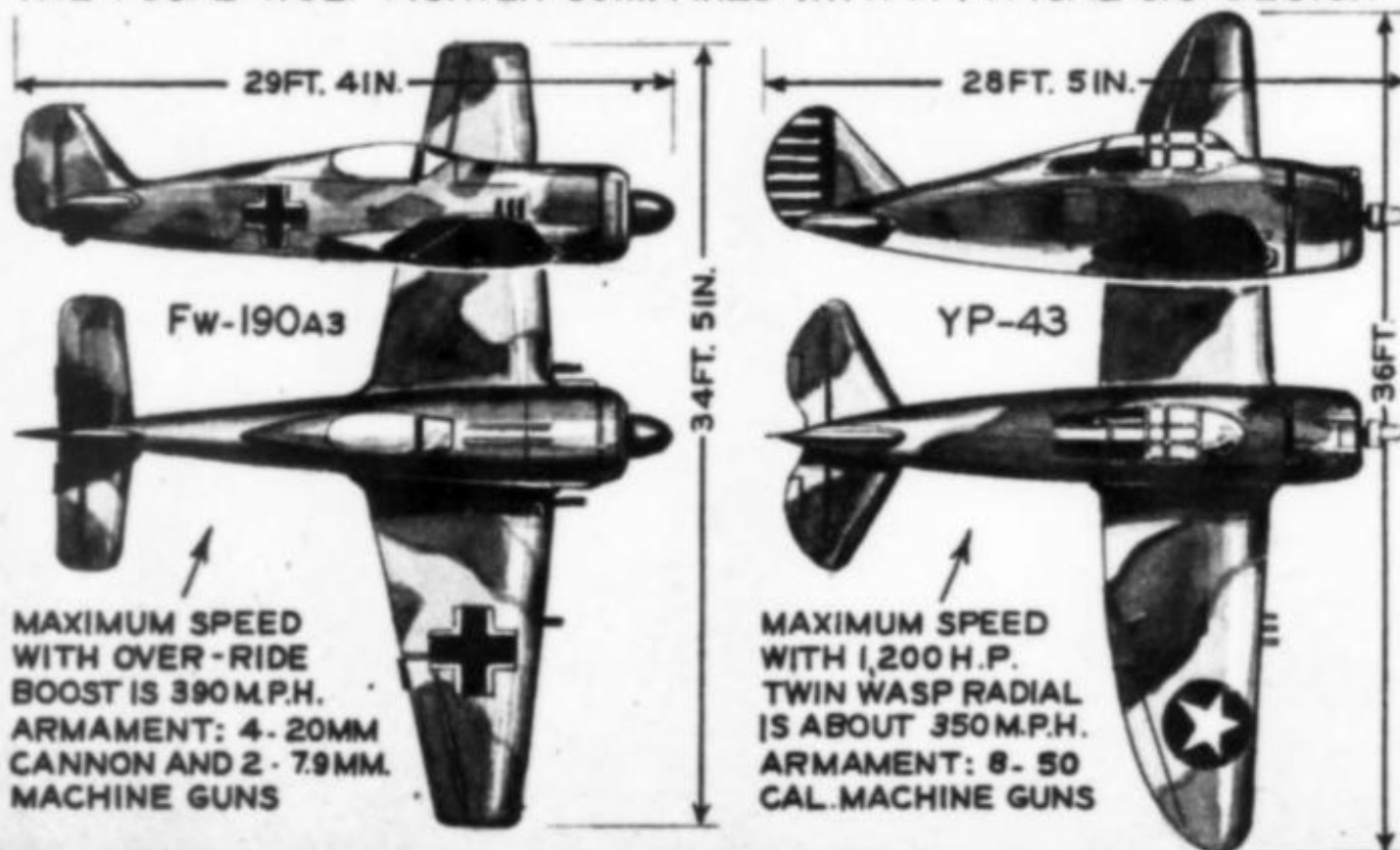
20MM. OERLIKON CANNON (450 ROUNDS PER MIN.)

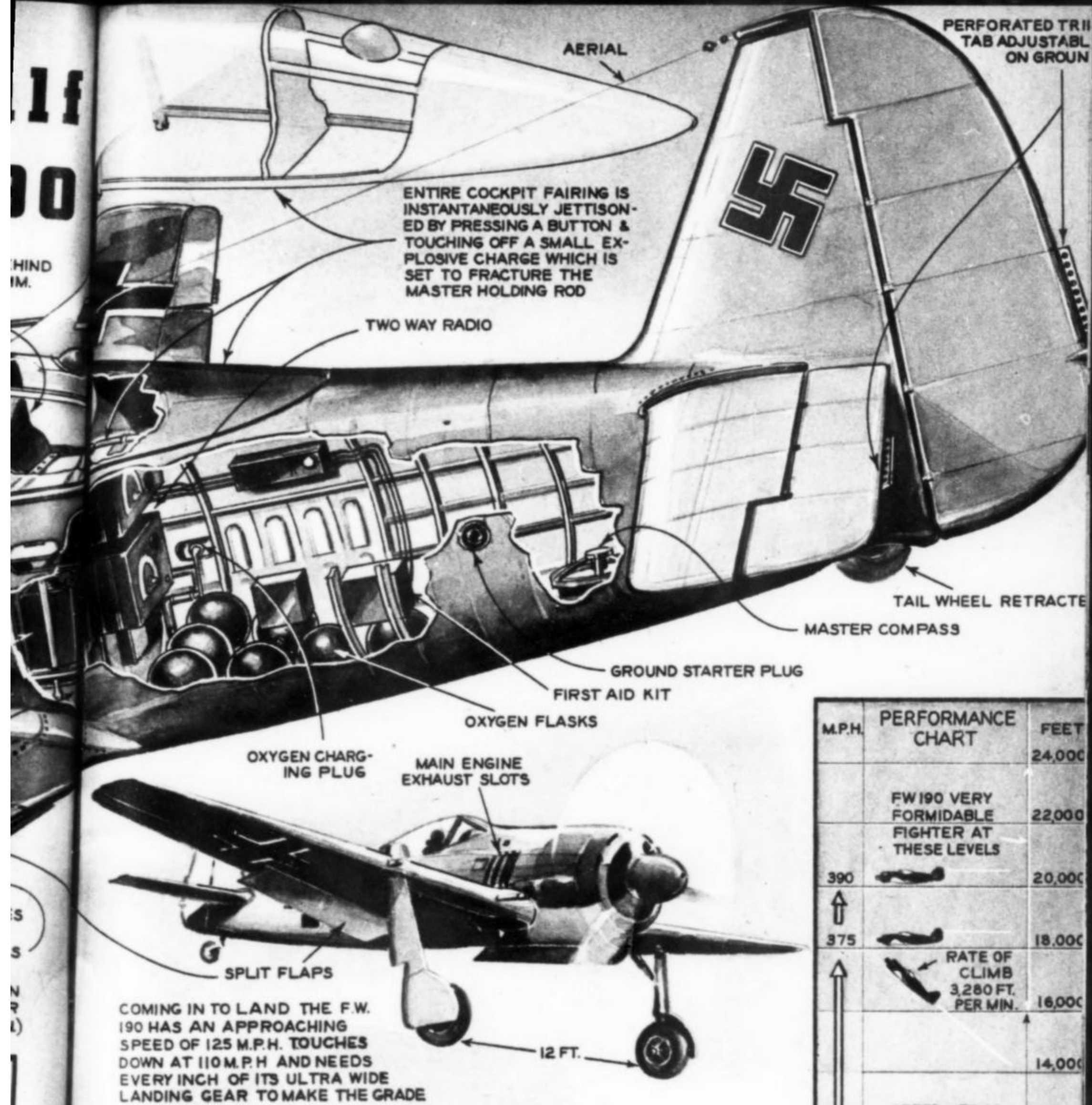
BATTERIES

FUEL TANKS

20 MM. MAUSER CANNON FIRES THRU PROPELLER DISC (700 ROUNDS PER MIN.)

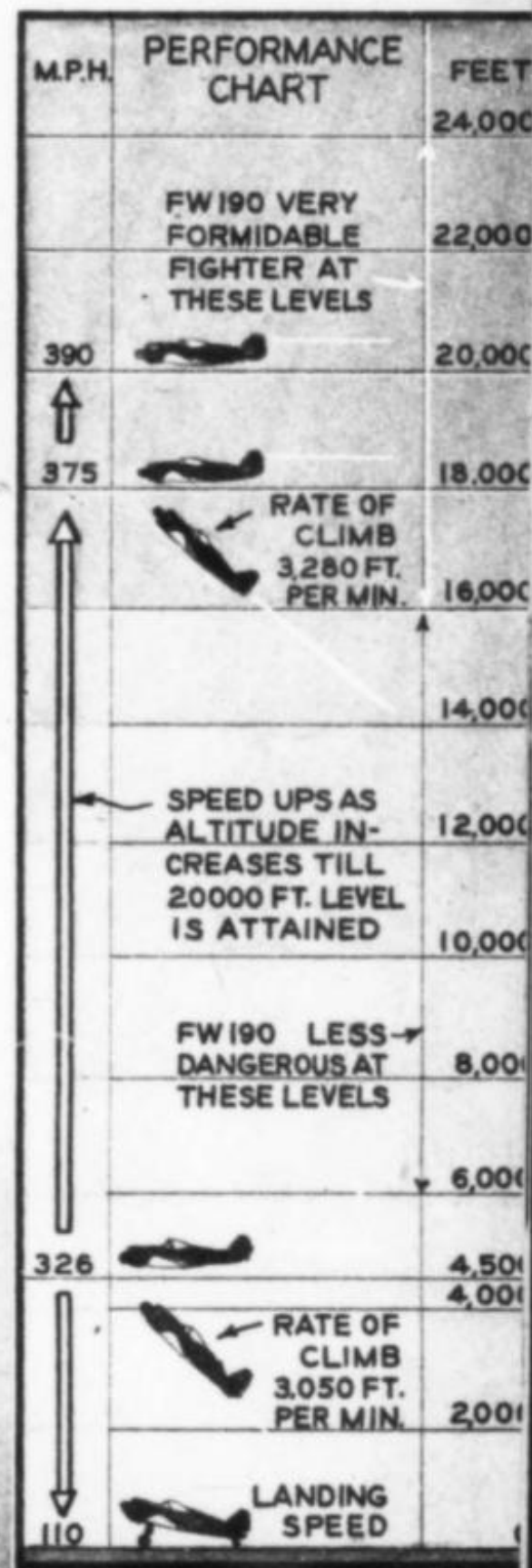
THE FOCKE-WULF FIGHTER COMPARED WITH A TYPICAL U.S. DESIGN





COMING IN TO LAND THE F.W. 190 HAS AN APPROACHING SPEED OF 125 M.P.H. TOUCHES DOWN AT 110 M.P.H. AND NEEDS EVERY INCH OF ITS ULTRA WIDE LANDING GEAR TO MAKE THE GRADE

THE 1,760 h.p. Focke-Wulf F.W. 190 is a formidable fighter only at altitudes between 16,000 and 24,000 feet. Unlike many Messerschmitts, it has self-sealing fuel tanks and pilot armor. It is armed with 4 cannon and 2 machine guns. The outer wing cannon are Oerlikons, which have relatively poor hitting power, however. The other guns are synchronized to fire through the prop. An electric retractable landing gear like that of our Mustangs, eliminates the old habit of German planes of "dropping a leg" when the hydraulic landing gear line was hit. Top speed is 390. American Flying Fortresses have shot down F.W. 190's.



MECHANIX ILLUSTRATED[®]

STILL
15^c

JULY



START A FISH FARM SEE PAGE 60
IN FULL COLOR—THE ART OF ARCHERY

ing last
iles and
at your
against

ally de-
special
s resist
ze-out,
ces ...

en your
chassis
n today,



ys on the
treds of
er—means
et smooth



THE
TEXAS
COMPANY

and station.

MECHANIX ILLUSTRATED

Title registered U. S. Patent Office

A Fawcett Publication

W. H. FAWCETT, Jr., President

ROGER FAWCETT, General Manager

RALPH DAIGH, Editorial Director

ROBERT HERTZBERG, Executive Editor

GILBERT PAUST, Feature Editor

LARRY EISINGER, Crafts & Hobbies Editor

ED RICHTSCHEIDT, Art Editor

Associate Editors: CLIFF TAYLOR

HARRY BATES

ROBERT BRIGHTMAN

WILLIAM E. DUGGAN

JO McCALLION, In Charge of Production

JULY, 1946

VOL. XXXVI No. 3

On the cover: Cross section of an aeronautical compass

SPECIAL FEATURES.

SEVEN LEAGUE SIGHT—by C. B. Colby.....	41
Airborne television brings world to our living rooms	
STARS—ATOMIC FURNACES—by Willy Ley.....	44
Sun, stars are nature's atomic experiments	
PARACHUTE EXPRESS—by Lester David.....	47
Non-stop delivery service for small towns	
THE NAVY GOES NORTH—	
by Cmdr. Fred "Buzz" Borries, Jr. U.S.N.	48
The Midway tests carrier efficiency in Arctic	
MI TESTS THE NEW CARS—by Tom McCahill	
MI's auto consultant checks two more '46	
models	
MERCURY	52
DODGE	54
TRENDS IN TRAILERS.....	56
Postwar trailers are mansions on wheels	
LIVE IN A GLASS HOUSE!—by Evelyn Borisoff.....	58
Less fuel, more warmth and better lighting!	
START A FISH FARM—by Don Romero.....	61
Finny livestock is a profitable business	
DON'T STALL!—by Ed Yulke.....	64
CAA's indicators warn of impending stalls	
THE NAVION	67
North American's entry in the postwar field	
SUPER SKYPORT	68
Our artist envisions the airport of tomorrow	
AISLE OF LIGHT	70
Curtains of brilliance bring planes in	
SCIENCE IN PICTURES.....	71
ARROWS AWAY!—by Ann Weber and Bill Jackson	81
Archery from A to Z	
HE POSES POOCHES.....	86
His camera clicks on nothing but dogs	
PIGMY SPEEDSTERS—by Robert Graham.....	88
Midget motorboats afford pleasure and thrills	
EGYPT'S PICTURE PEBBLES—by Don Romero.....	92
Incredible stones contain pictorial scenes	
WHITTLES' WIT	95
Eating made easy by a humorous inventor	
CHURCH A LA CARTE—	
by Joseph Kostin and Roger Wade.....	96
Chef's dream created a beautiful model	

CRAFTS AND HOBBIES

MODERN DRESSING TABLE—	
by Benjamin Nielsen	97
Furniture to please the better half	
GRUMMAN TIGERCAT	100
A twin-engine control-line F7F gas model	
TOYS FOR OUTDOOR PLAY	106
BUILDING A TRAILER BED	108
BOATS AND BOATING—by William F. Crosby.....	110
This month: The different types of boats	
FISHING CHAIR FOR YOUR CRUISER	112
Something Izaak Walton never had	
CLAMP FOR DRILLING	114
A drill press accessory	
CAR CARE—by Frederick C. Russell	116
TWO-TUBER FOR JUNIOR—	
by Royden R. Freeland	118
A shock-proof set for the little shaver	
HOME AND SHOP IDEAS	122
QUARTER-DECK TABLE	124
A novel end-table for the living room	
CHIPPENDALE MIRROR	125
NEW PRODUCTS	126
JOINTED CIRCUS ANIMALS	128
Toys that strike a pose	
VENEERED TABLE LAMP	129
DOLL SWING FOR YOUR DAUGHTER	130
A miniature love-seat swing	
A BIRD OF A CLOTHES HANGER	132
VANITY TREATMENT	132
MI PLANS	133
HOME AND SHOP POINTERS	134
CAN YOU NAME THESE SAWS	135
Test your saw know-how	
PHOTO CONTEST	136
DOUBLE-TALK WITH NEGATIVES	137
by Kenneth Murray	
New pictures from old negatives	
BE SURE BEFORE YOU SHOOT	133
What to check in lighting equipment	
PHOTO PLAQUES	139
DARKROOM HIGH LIGHTS	140
QUESTION BOX	140
FOCAL FRAME FOR CLOSE-UPS	141
GET THE RANGE FOR A DIME	142
A range finder for any camera	

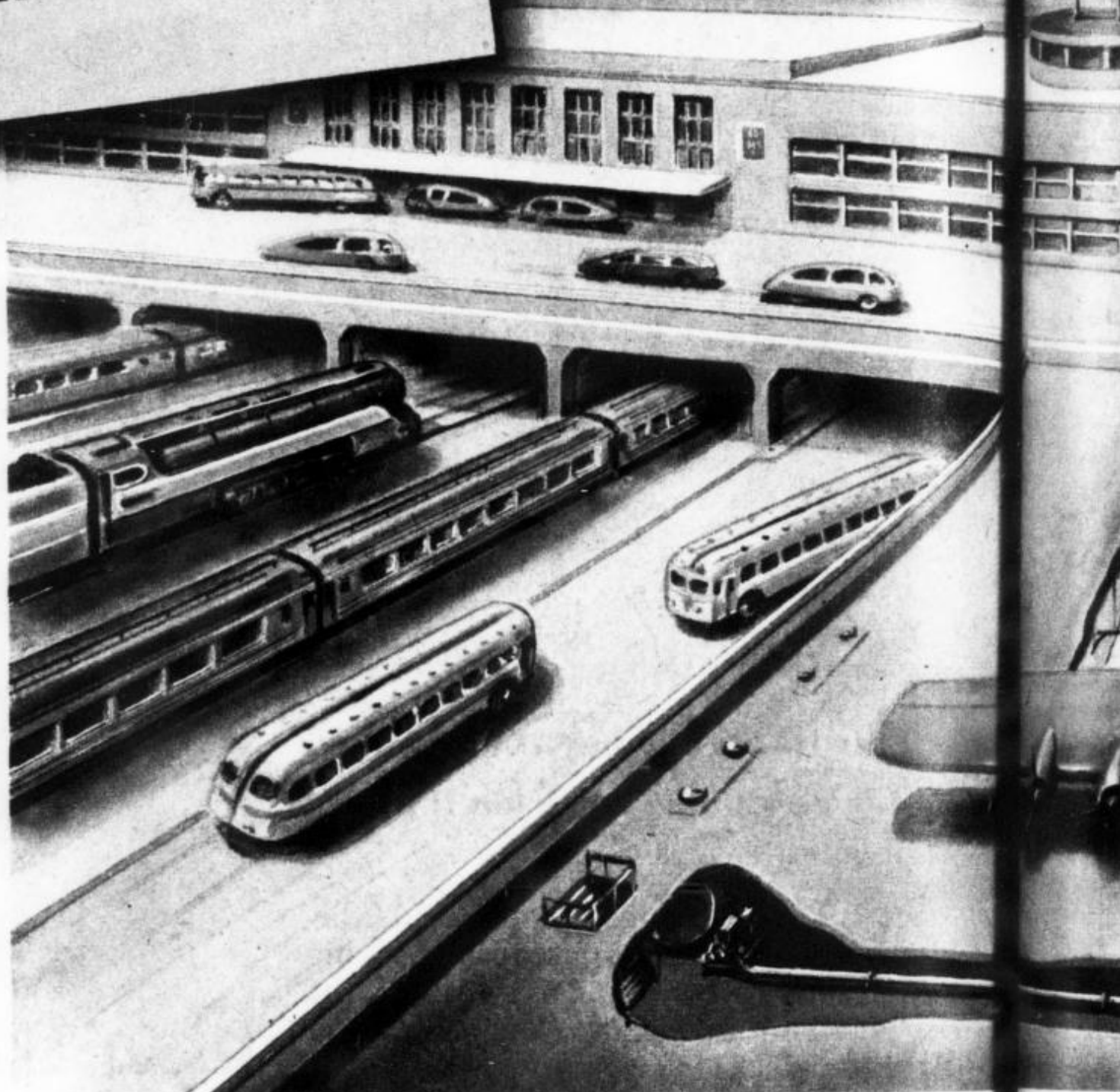
Copyright 1946 by Fawcett Publications, Inc.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville 1, Ky. Printed in U. S. A. Advertising Offices, 295 Madison Ave., N. Y. 17, N. Y. Editorial Offices, Paramount Building, 1501 Broadway, New York 18, N. Y. West Coast Representatives: Los Angeles, H. P. Houston, Edward S. Townsend Co., Pacific Mutual Building; San Francisco, Edward S. Townsend, Edward S. Townsend Co., Russ Building. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Allen E. Norman, Secretary; Gordon Fawcett, Treasurer; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1946 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to MECHANIX ILLUSTRATED, 52 Wall St., New York 5, N. Y. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to Circulation Department, 22 West Putnam Avenue, Greenwich, Conn. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 15c per copy. Subscription price \$1.80 per year in Canada, the United States and possessions. Foreign subscriptions \$2.90 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds, payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

SUPER SKYPORT

Aviation's phenomenal growth prohibits a permanently satisfactory airport, but indications point to the skyport of tomorrow being like this.



DESIGNING a permanently adequate city airport is an impossibility. Aviation grows too rapidly and too unpredictably for the most psychic architect to say "This is it!" with any self confidence. Here our staff artist goes out on a limb to design a municipal airport for a mythical city, not to say "This is it!" but to suggest an airport of interesting design embodying several unique features to whet the imagination.

The fan-shaped field, completely surfaced, offers take-off in any direction

regardless of wind direction. It's administration building in "fan-handle" location provides the traffic control tower with excellent over-all observation and makes possible close contact between passengers and waiting planes. The interesting underground ramps and all-weather elevators transport cargo and all passengers to the planes maneuvered over the elevators which, when lowered, are flush with the field surface. Fuel pumps and service pits spotted about the field provide fast servicing by special crews, while the com-



pletely surfaced field facilitates fast straight-line truck and vehicle travel to any part of the field in an emergency.

Construction adjacent to the rapid transit lines to the downtown area means fast transfer into the city itself, invariably an impossibility with most present municipal airports. The perimeter auto ramp about the building handles passenger and cargo traffic and brings vehicles directly to the terminal's covered entrances on either side. Huge obstruction-free windows present the panorama of the

field's drama to sightseers and waiting passengers, always a dividend-paying detail of airport design.

It is possible that in the future special launching rocket units such as "Jato" will be employed to lift giant airliners from the runways. In this case the fields of the future may be considerably smaller and more compact. It may also enable the designers to locate the fields closer to the center of cities, for the rocket assisted take-offs will enable the aircraft to clear buildings near [Continued on page 165]



aisle of light

Curtains of brilliance will guide tomorrow's airliners to safe landings at New York's great Idlewild Airport.

SOME months ago at the Jones Beach State Park Amphitheater on Long Island, New York, outdoor stage scenes were changed behind a vertical screen of brilliant light. In the near future a similar screen of vertical light, split by an 8,400-foot runway, will guide aircraft pilots into the giant Idlewild Airport of New York City.

As the pilot approaches the field two thin vertical walls of light shoot into the rain or fog above it. Between them will stretch the runway down which he will glide to a safe, sure landing. To produce this unusually effective "thick-weather" landing guide special lamps had to be designed by Westinghouse engineers. Each [Continued on page 166]

The Navion



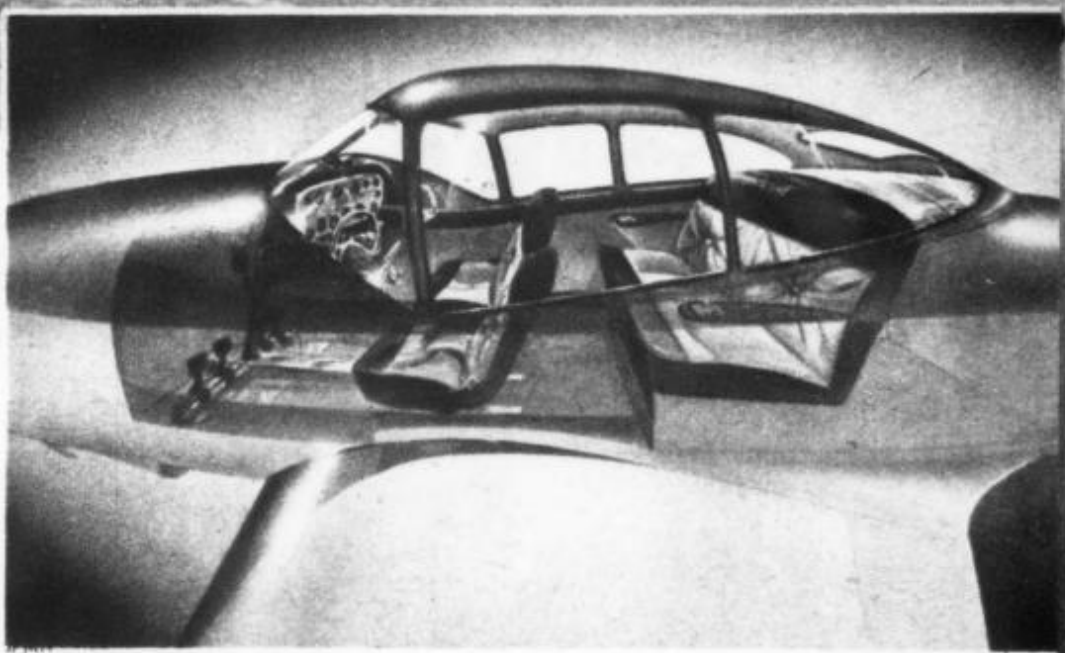
Like its big brother, the Mustang, this new plane has what it takes!

ALREADY tagged "the Colt," because of its resemblance to its big veteran brother, the P-51 Mustang, the "Navion" is North American Aviation's sleek entry into the postwar private plane derby.

This four-place, all-metal low-wing features fully electrically retracting tri-cycle gear, a luxurious automobile interior and plenty of performance.

A new and specially-designed wing is responsible for unusually good aileron control up to and through the stall. The outer wing panel on each side is inclined nose-down three degrees as compared to the angle of the wing root or in-board section as well as having a greater camber than the in-board sections. This maintains lift at the wing tips and [Continued on page 172]

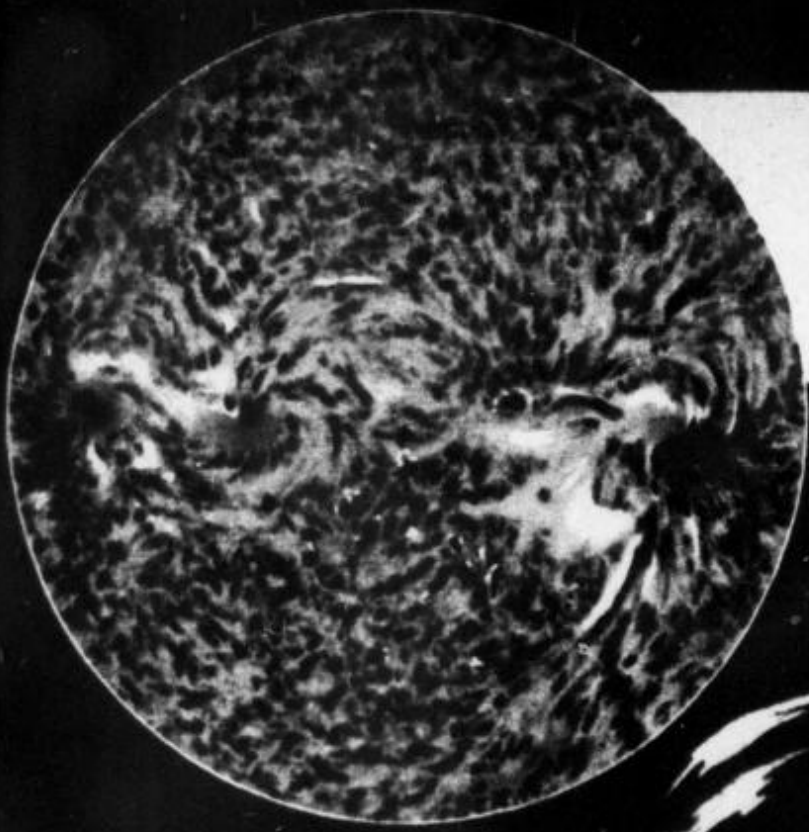
July, 1946



Sketch above shows roominess of the cabin, as well as the luxurious appointments of interior. Photo below shows comfortable fit for four.



stars — ATOMIC FURNACES



ELECTRIC PARTICLES
OF SOLAR ENERGY
FROM SUN'S INTERIOR
SPEEDING ACROSS SPACE

HYDROGEN FLAMES
FALLING BACK INTO
THE SUN

ASCENDING
HYDROGEN FLAMES
REVOLVING OPPOSITE
TO MAIN CYCLONE

SURFACE 5500° TO 6000° C.

HIGHLY MAGNETIC FIELD

PHOTOSPHERE SURFACE

SOLAR GENERATOR
OF RADIO WAVES
BY THE TRANSMUTATION OF ATOMS
AT HIGH TEMPERATURES

SUPERHEATED GASE
SPIRALING
FROM SOLAR DEPTH

DEVELOPING WHIRLPOOLS
OF MILLIONS OF DEGREES CENTIGRA

It's been feared that atomic fission may get out of control, turning earth instantly into a blazing star. Can this happen? Here's the answer of science.

BY WILLY LEY

TEN hours of atomic war would set humanity back a thousand years, but ten years of atomic peace would advance us a century, if not more.

The choice looks simple indeed, but there are many who sense a danger factor even in atomic peace. Suppose a team of experimenting scientists sets off a chain reaction which cannot be restricted. Suppose the "atomic fire" of an industrial establishment gets out of hand through an ordinary everyday accident. What then?

Wouldn't the whole earth die the

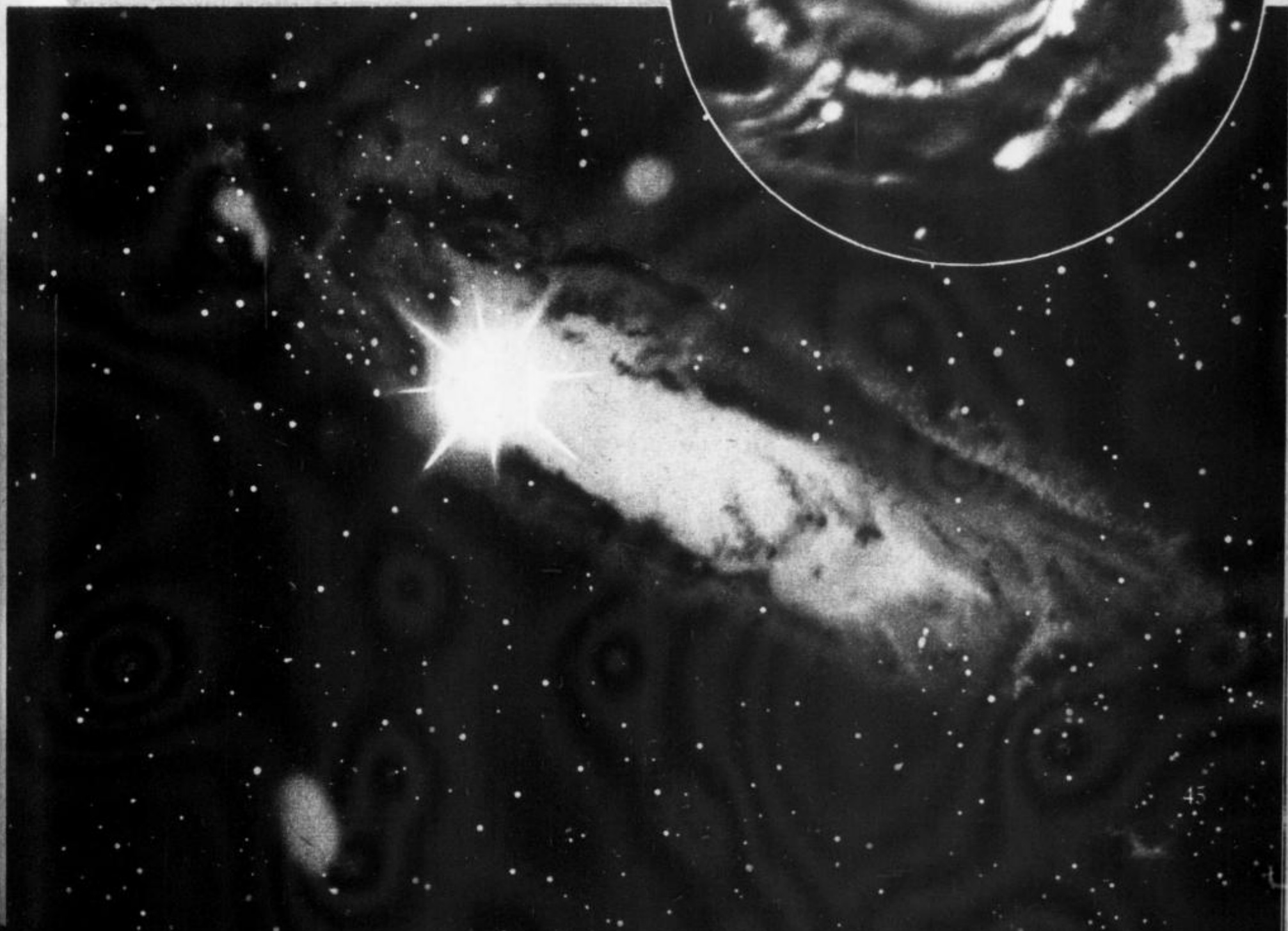
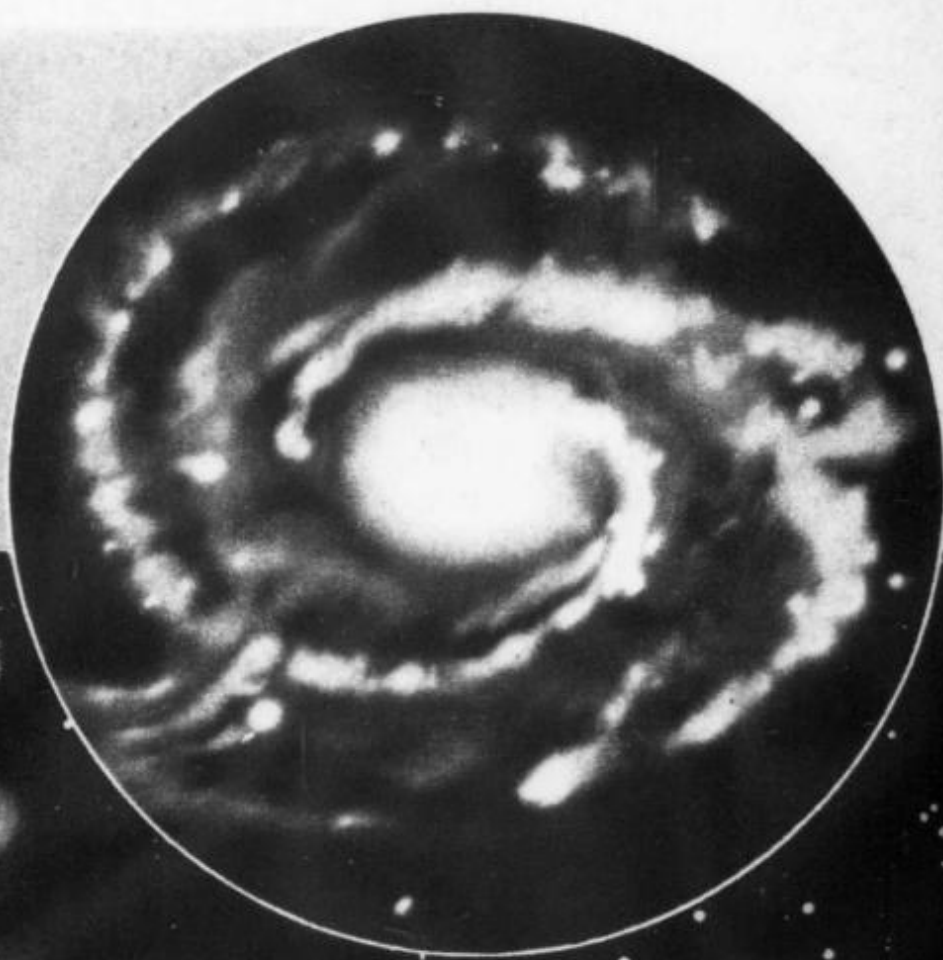
atomic death then, disappear instantly in a flash of atoms run wild, or, put in other words, turn into a blazing sun?

The answer to these fears is "No."

The nuclear reactions going on in the reaction chambers of an industrial establishment will not be able to fissionize the atoms of the surrounding air or of the ground underneath.

The disintegrating atoms of uranium or plutonium can and will influence the atoms of nearby matter in a certain way, but not in the way feared by some. The atoms of the surrounding matter may be-

Pictorial diagram, left, is a section through the surface of the sun, showing the colossal energy whirlpools which result when elements are stripped of their electrons. The insert shows a pair of sunspots—solar cyclones each thousands of miles across. In circle to right is a spiral nebula in Canis Major, and, below, Andromeda, with a super-nova (exploding star). Every nebula is made up of billions of stars; every star is an atomic furnace like our sun.



MECHANIX

MARCH

ILLUSTRATED

(Reg. U.S. Pat. Off.)

4 MAGAZINES
IN ONE

**BUILD A MODEL OF
THIS NAVY PT BOAT
SEE PAGE 112**



WIN! Aeronca Plane • Crosley Sedan
• Atlas Lathe • 100 Other Prizes
Annual Big Easy-To-Win Contest!

PRICE
10 CENTS

MECHANIX ILLUSTRATED

MARCH
1942

Volume XXVII
Number 5

W. H. FAWCETT, JR., President

Copyright 1942 by Fawcett Publications, Inc.

SPECIAL FEATURES

The Battleship Is Sunk - - - - -	35
<i>By Arch Whitehouse, Noted Air Writer</i>	
Gowns By Bossy - - - - -	39
Aerial Navies Of The Future - - - - -	40
<i>By Lieut. Douglas Rolfe, R.A.F.</i>	
At Sea In A PT - - - - -	46
Mother Earth Is Getting Plump! - - - - -	49
<i>By S. R. Winters</i>	
Yqur Life Is In Your Hands! - - - - -	50
<i>By J. Warren Martin</i>	
Why Fly In Formation? - - - - -	54
Never-Miss Kris! - - - - -	56
<i>By Andrew R. Boone</i>	
Models Try New Tricks - - - - -	60
For Your Safety—Know Your Bombs! - - - - -	61
Run 'Em With Steam - - - - -	65
<i>By Harry De Lasaux</i>	
SECOND ANNUAL MI CONTEST - - - - -	66

(Continued on page 6)



ARCH
WHITEHOUSE

Few aviation writers have had the background enjoyed by Arch Whitehouse, whose article, "The Battleship Is Sunk," appears on page 35 of this issue. As an officer in the Royal Flying Corps in the last World War, he was officially credited with downing 16 enemy planes and six balloons. He has followed military aeronautics consistently since he was demobilized from the R. A. F. in 1919 and in the interim has written more than ten million words on the subject of aviation, including two major books on military aviation. His stories appear frequently in *The Saturday Evening Post* and his most recent serial in that magazine, "Spitfire Squadron," has been purchased by 20th Century-Fox Films to be made into a movie. He is considered an expert on modern air gunnery and has been consulted by designers on the subject. The U.S. Navy recently invited him to make a tour of inspection of the North Atlantic Fleet.

DON'T MISS THE CONTEST!

You might as well win that grand Aeronca Defender Trainer plane, that slick Crosley Sedan, that swell Atlas Lathe as anyone else! And even if you don't win one of these, there are nearly a hundred other prizes to make your eyes pop!

This is the greatest prize contest in our history—a contest with greater prizes, more prizes and a better chance to win!

Turn to the contest, on Page 66, at once. And order your April MI early!

54 PAGES OF HOBBIES AND HOW-TO-BUILDS STARTING ON PAGE 93

On The Cover: U. S. Navy PT Boat—Kodachrome By Rudy Arnold.

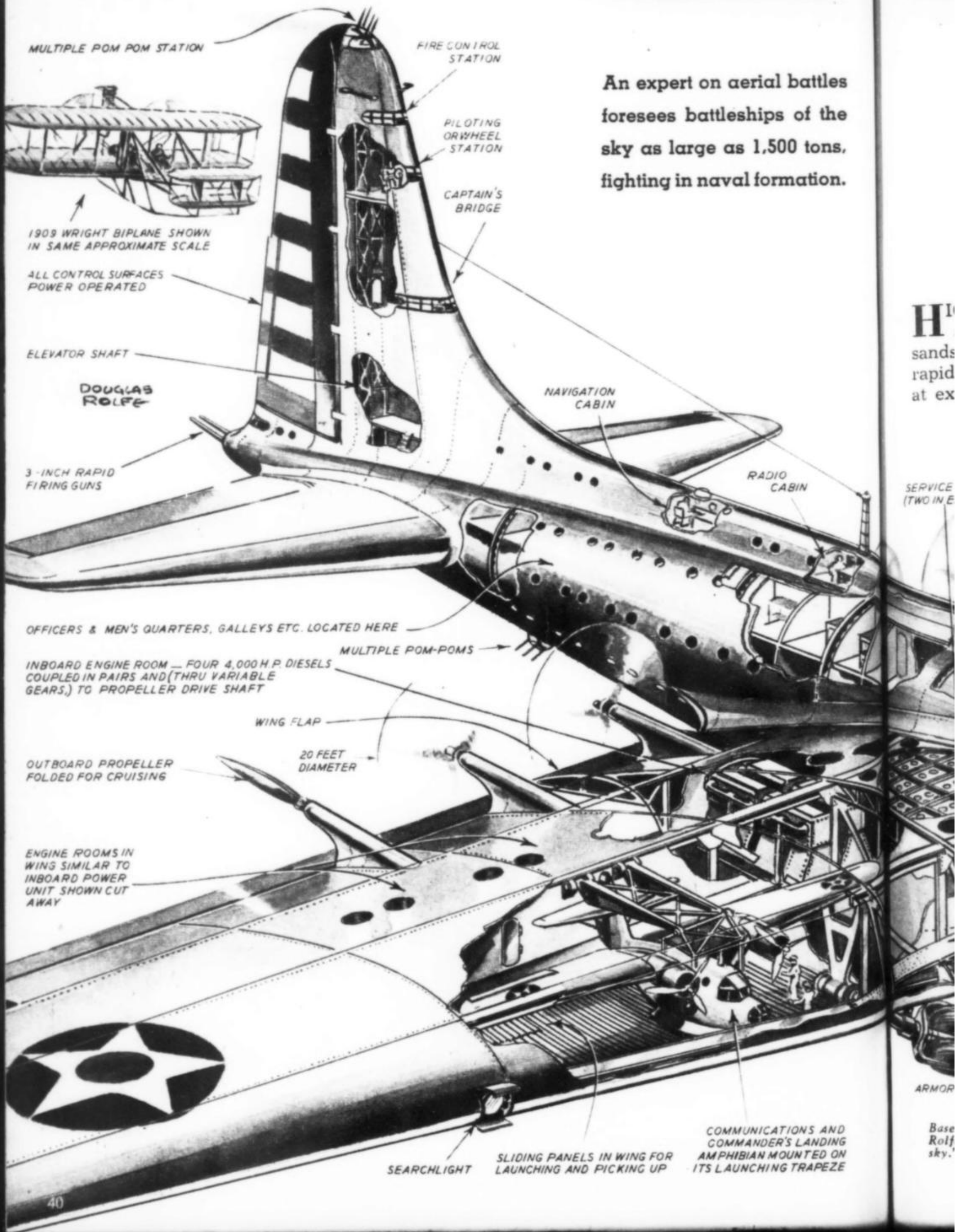
ROBERT HERTZBERG, Editor

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 1100 W. Broadway, Louisville, Ky. Printed in U. S. A. Advertising and Editorial Offices, Paramount Building, 1501 Broadway, New York, N. Y. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Ralph Daigh, Editorial Director; Al Allard, Art Director. Entered as second-class matter at the post office at Louisville, Ky., under the act of March 3, 1879. Additional entry at Greenwich, Conn. Copyright 1942 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to New York Editorial Offices. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 10c per copy. Subscription price \$1.00 per year in U. S. and possessions. Canadian subscriptions not accepted. Foreign subscriptions \$2.00 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

AERIAL N

An expert on aerial battles foresees battleships of the sky as large as 1,500 tons, fighting in naval formation.



NAVIES OF THE FUTURE

by Lieut. Douglas Rolfe (Hon.), Royal Air Force

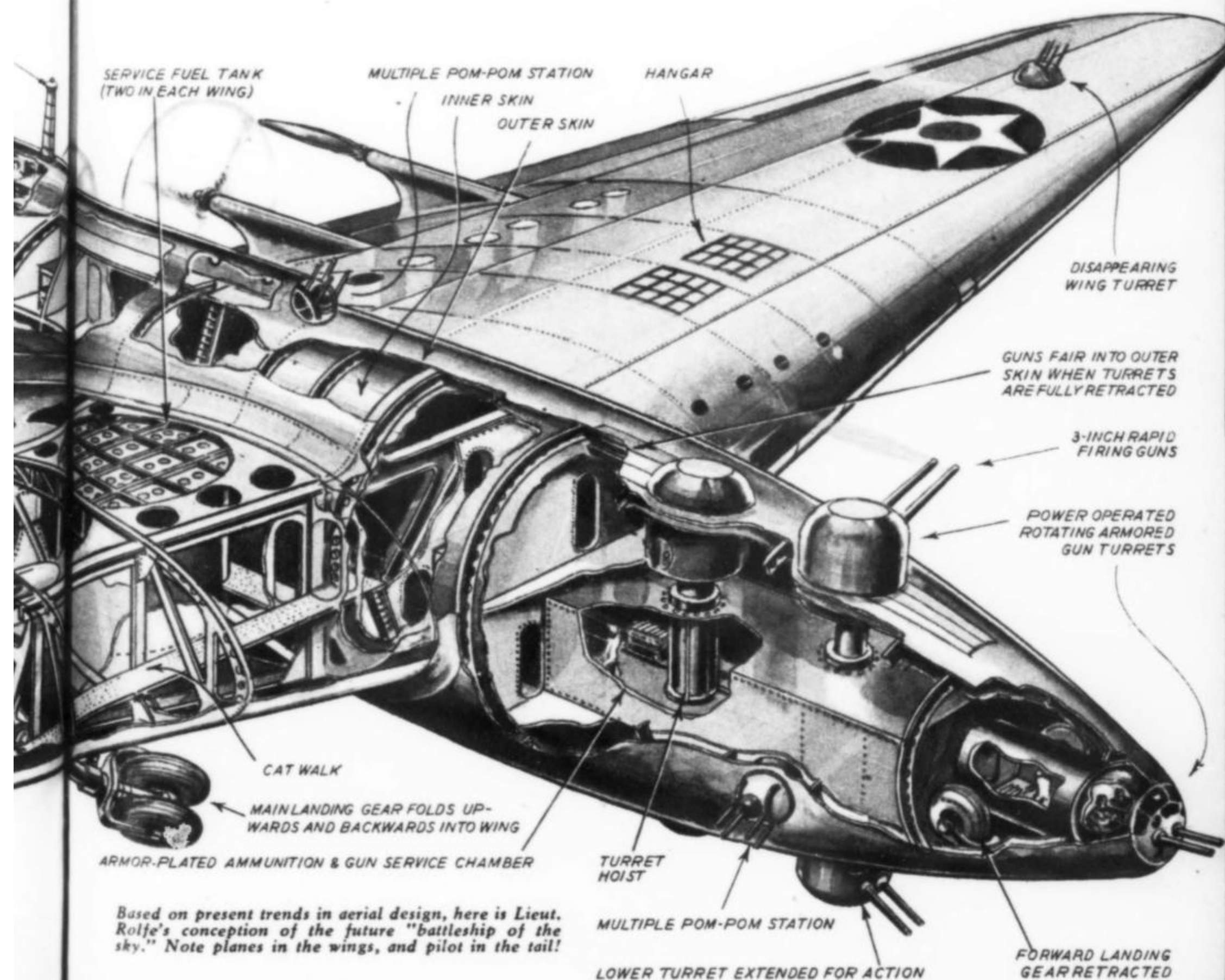
Illustrations by the author

The following article was written approximately two weeks before the surprise Japanese attack on Pearl Harbor. We believe the resemblance of the essential strategy described here to that of the attack on Pearl Harbor is remarkable, and is strong evidence that the author's reasoning throughout the article is sound. The cutaway drawing of an aerial battleship of the future on this page deliberately stresses present day trends in design, and avoids imaginative thinking as much as possible.

HIGH above the travelled air lanes the aerial armada sweeps on. Already thousands of miles from its home base and now rapidly approaching the main objective it flies at extreme altitude in order to fulfill one of

the fundamentals of war so tellingly brought home in the last great conflict of 1939-43, the element of complete surprise.

Flanked by heavily gunned lightly armored "cruisers" and screened by incredibly swift



8,000 H.P.

"destroyairs" hundreds of huge bombers, veritable battlewagons of the air, spread their wings in ordered ranks across the thin upper blue as far as human eye can see.

Accompanying this formidable array of fighting aircraft are troop transports, each with its complement of six hundred fully equipped armed men; carriers, literally bulging with amphibian gliders and "fifth-column commercial planes"; supply and repair planes carrying fuel, stores, spares and the necessary machinery for servicing and effecting minor repairs; hospital planes and still more transports carrying munitions, guns and mechanized equipment

1,500 H.P.

800 H.P.

400 H.P.

1919 - TYPICAL BOMBER OF THE EARLY TWENTIES WAS THIS 4-PLACE MARTIN BIPLANE - WING SPREAD WAS 71 FEET AND THE MAXIMUM SPEED ABOUT 110 MPH

1910 - THE WRIGHT MODEL "B" WHICH FORMED THE NUCLEUS OF UNCLE SAM'S AIR CORPS HAD 42 A TOP SPEED OF 40 M.P.H., WEIGHED ABOUT 800 LBS.

1917-18 - DESIGNED IN EUROPE BUT PRODUCED IN THIS COUNTRY THE D.H. 4 WAS USED ON EARLY AIR MAIL ROUTES

suff
trat
F
bon
are
equ
way
par
nov
the
not
boa
N
mil
try
F
air
ope

1942 - WEIGHING 82 TONS AND SPANNING MORE THAN 200 FEET THE DOUGLAS B-19 IS THE WORLD'S MOST POWERFUL WARPLANE AND AN INDICATION OF THINGS TO COME

4,000 H.P.

1937 - THE ORIGINAL "FLYING FORTRESS" BOEING'S GREAT YB-17 BOMBER SPANNED 105 FEET, WEIGHED 16 TONS AND MADE OVER 200 MILES AN HOUR WITH FULL WAR LOAD

1935 - THIS LATER MARTIN BOMBER STRUCK AN ENTIRELY NEW NOTE IN BIG BOMBER DESIGN - WITH A 71 FOOT WING SPAN IT WEIGHED 7 TONS

Airplane power and tonnage have increased by leaps and bounds in the past five years, as Lieut. Rolfe strikingly shows in the accurate, scaled drawings on these pages. The present war is unlikely to do more than "supe up" our present-day aerial designs.

sufficient to develop and exploit a concentrated attack from the air.

For this is no ordinary formation of bombers and protective fighters such as we are familiar with today. It is a completely equipped and self-contained expedition on its way to launch an utterly unexpected and paralyzing attack upon a far-off nation even now blissfully imagining itself at peace with the world and secure in its isolation and the not inconsiderable defensive air power it boasts.

Now they are but a few hundred miles from the shores of the doomed country.

From the flagship, where the commanding air marshall and his staff are gathered in the operations control cabin, a silent signal flashes

forth and immediately the entire fleet swings into a continuous circling movement at reduced speed while from the carrier ships drop innocent looking commercial planes cunningly faked to pass as friendly craft from bordering nations.

They drop rapidly and disappear in the direction of the objective.

All will land shortly thereafter at widely scattered airports in the country scheduled for invasion. Some will remain to spread a net of spies and saboteurs but others will depart in apparent normal air line routine only to return to the mother ship and report what they have gleaned. Another signal flashes through the fleet—battle stations are manned. Ugly looking cannon now peer through the hitherto sleek skins of the battle planes and



Effective bombing range of planes of various types is dramatically shown in above map.

the fleet deploys for the calculated lightning attacks about to be delivered in perfect synchronization at previously selected key centers.

The pattern of each attack is similar. The bombers move in to drop their deadly loads—two hundred tons at a time from each ship; the cruisers use their long range cannon to effectively prevent the approach of defense fighters and to silence the flak and other defense batteries below, and the destroyers range everywhere—dive bombing, strafing and disrupting nerve centers of the belated defense action and covering the landing of the air borne troops which follow. The amphibian gliders land in clusters everywhere to immediately shed their wings and become, on land, light combat cars, on sea, deadly mosquito craft.

As confusion spreads the heavy mechanized equipment is landed to back up and develop the initial attack until all resistance has been smashed. Striking at dawn all these operations are carried out in broad daylight and such is the force and suddenness of the attack that it accomplishes its whole purpose before

night falls. The commanding air marshal, who has been directing operations from his flagship high above the struggle, now descends to take over control of the conquered country. The entire invasion has been completed without the use of a single surface craft other than those brought by air with the invading fleet!

A fantastic picture? No! Probable? Yes, unless human nature undergoes a drastic change within the next few decades. There is certainly nothing in recent history to suggest such a change and the effective outlawing of war while, on the other hand, everything now transpiring indicates the increasing employment of much larger and much deadlier aircraft in waging war.

How about size then?

The smallest of the ships depicted in the alarming picture just drawn, the destroyers, are visualized as being of about 150 to 200 tons apiece while the heavy bombers, the real flying battleships, the supply ships and carriers would range from 600 to 1,500 tons gross weight! Is this stretching things too far—can such mammoth ships actually be built? Not at once perhaps, nor for several decades, but certainly within the lifetime of most people today.

The largest bomber produced today, the Douglas B-19, has a gross weight of 82 tons. At least one reliable engineer has laid down the general requirements for a 168 ton plane, powered with engines totalling 28,000 horsepower and carrying a useful load of 84 tons. Even larger ships have been suggested and as engineers with a national reputation to think of do not ordinarily indulge their pipe dreams in public print it may be assumed that planes will get bigger and bigger as the demand arises.

The famous designer, Igor Sikorsky, stated in an interview which was published in the October, 1936, issue of this magazine that: "he had at the moment complete plans be-



The largest flying boat ever built, the Martin "air battleship" of 70 tons, will transport 150 fully equipped troops.

fore him for a 50 ton plane; that in his opinion 50 ton planes would be in regular transoceanic service within three or four years; that 500 ton planes might be expected within two decades and that *'there seems to be no practical limit in sight for the size of a sea-plane!'* "

This prediction was made five years ago. Since then planes have been in regular transoceanic service and the tonnage has been stepped up to over 80 tons. In view of these facts we may safely skip the technical aspects of size and take the engineers at their word that airplanes are going to get bigger and bigger.

What about range? At the outset of this article it was assumed that airplanes could and would operate thousands of miles away from their bases as freely as do naval fleets today. Is this assumption warranted? Yes, it would seem so. Apart from the developments to be expected in improved power plants and fuel consumption in relation to horsepower the fact remains that some of the larger bombers now under construction could, if necessary, fly to Europe and back without refueling.

A few years ago one of the surest ways to commit suicide in a blaze of publicity was to attempt a transoceanic flight.

Today, the Clippers arrive and depart with clock-like regularity while streams of

American built bombers drone daily across the Atlantic for service in the R.A.F.

Tomorrow, planes will undoubtedly operate with the same freedom as do surface vessels today, merely putting into far-off ports to take on fuel and refit.

Are there any other reasons for supposing that aerial navies of the type envisioned will come into being and perhaps entirely displace sea power as we know it today? In order to answer this question and to estimate properly the growing importance of the plane as a war weapon in its own right let's glance over its startling development from a flimsy practically useless side line in army and navy equipment to the position it holds today when even sea power is endangered by the deadly dive-bombers and the equally deadly torpedo planes.

Less than thirty years ago, in 1912 to be exact, crude experiments in aerial bombing were made both here and abroad, as well as were the first attempts to mount machine guns.

In the same year airplanes had their baptism of fire when a few were employed in the current Balkan wars as reconnaissance machines. With a maximum and a minimum flying speed coinciding somewhere below the forty-five mile an hour mark, they were probably a greater source of

[Continued on page 157]